Visual PSTricks

Version 2.30

Jean Pierre Casteleyn
IUT GTE
Dunkerque, France

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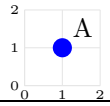
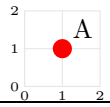
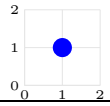
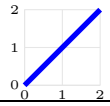
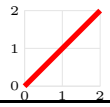
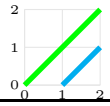
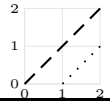
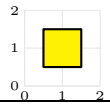
Objectives :
— an image per command or parameter.
— the minimum text possible.
— the most compleate possible.

Légend

	Basic node
	Calculated node
	a point
	[Base element]
	Additional element
	Other additional element
	to highlight the command, the option oe a parameter
	Filling color (By default : white)

You can contact me at my personal email to
— let me know the mistakes found
— give me your commentaries, your suggestions . . .

Thanks to :
Alain Bécue , Denis Bitouzé, Jean Côme charpentier, Martin Giese, Denis Girou, Alexander Grahn, Christophe Jorssen, Dr. Uwe Kern, Manuel Luque, Dominique Rodriguez, Michael Sharpe, Tobias Nähring, Herbert Voß, Timothy Van Zandt.

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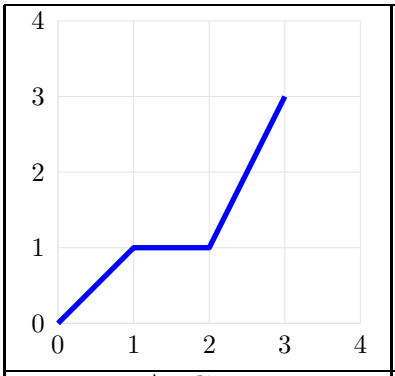
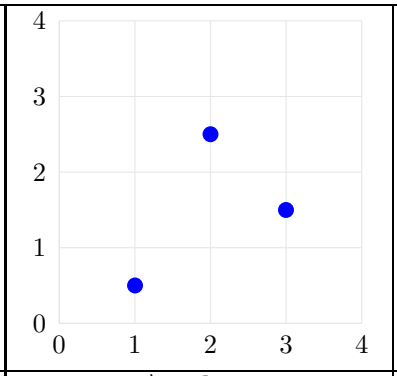
1 basic figures

1.1 Commands without asterik



\psline
(0, 0)(1,1)(2,1)(3,3)



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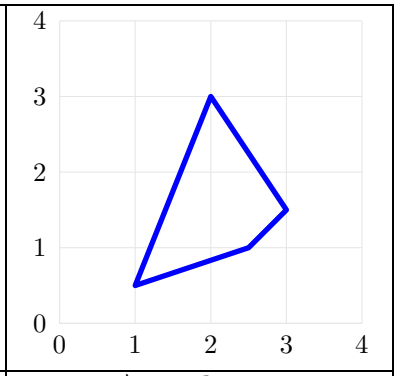
(1,0.5)(2,2.5)(3,1.5)



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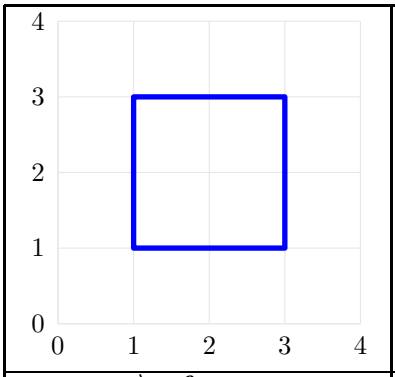
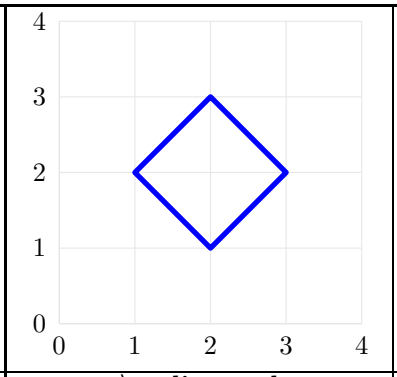
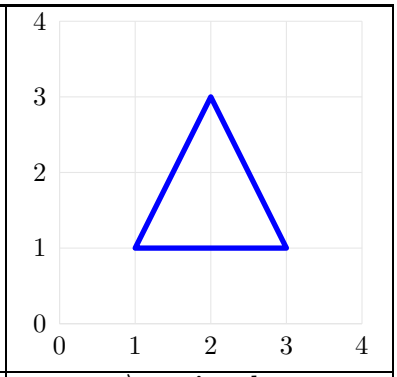
(1,0.5)(2,3)(3,1.5)(2.5,1)



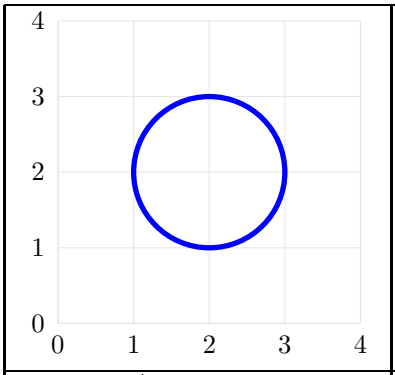
\psframe
(1, 1)(3, 3)



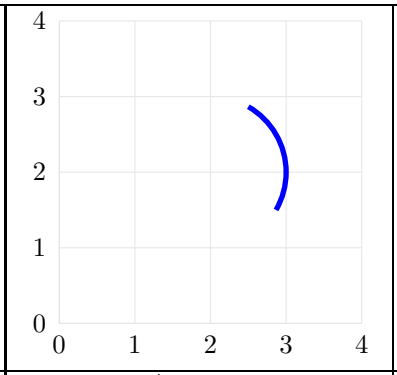
\psdiamond
(2,2)(1,1)



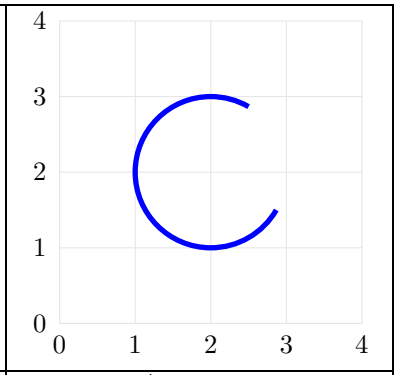
\pstriangle
(2,1)(2,2)



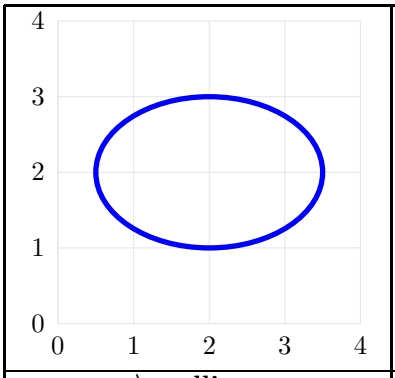
\pscircle
(2,2){1}



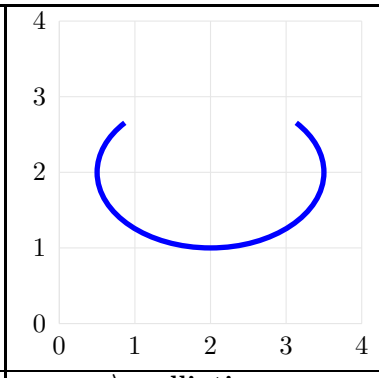
\psarc
(2,2){1}{-30}{60}



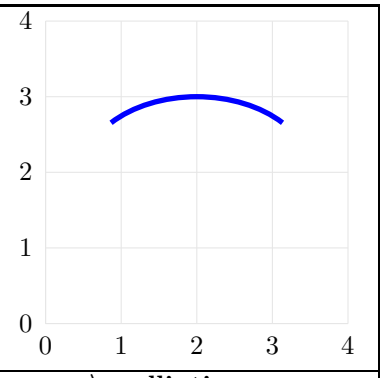
\psarcn
(2,2){1}{-30}{60}



\psellipse
(2, 2)(1.5,1)



\psellipticarc
(2, 2)(1.5,1){150}{30}



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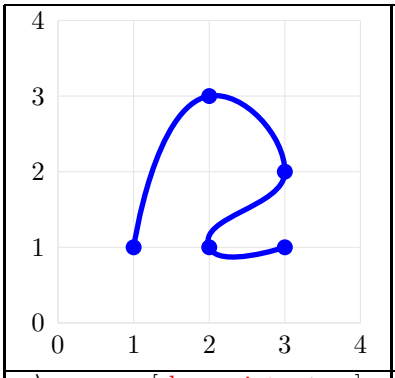
(2, 2)(1.5,1){150}{30}



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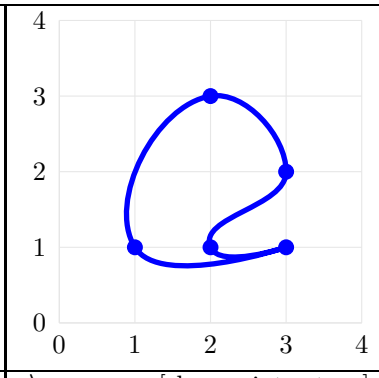
(1,1)(2,3)(3,2)(2,1)(3,1)



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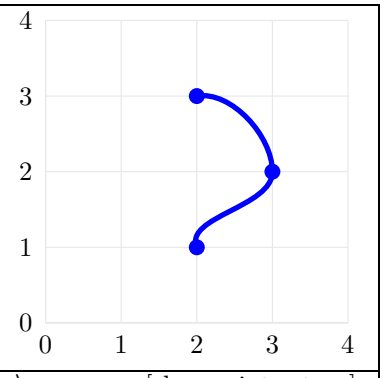
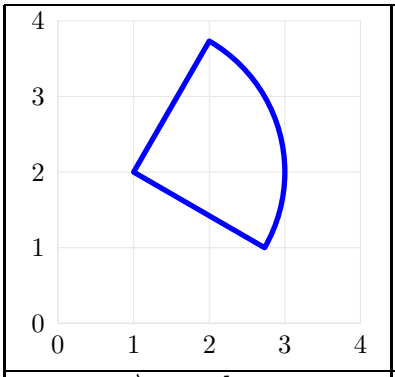
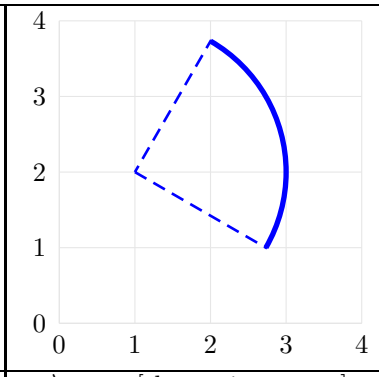
(1,1)(2,3)(3,2)(2,1)(3,1)



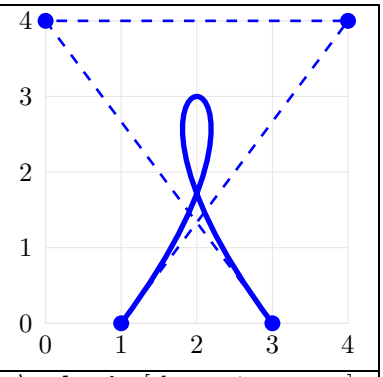
\psecurve[showpoints=true]
(1,1)(2,3)(3,2)(2,1)(3,1)



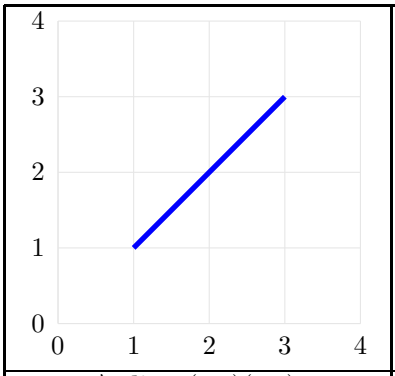
\pswedge
(1,2){2}{-30}{60}



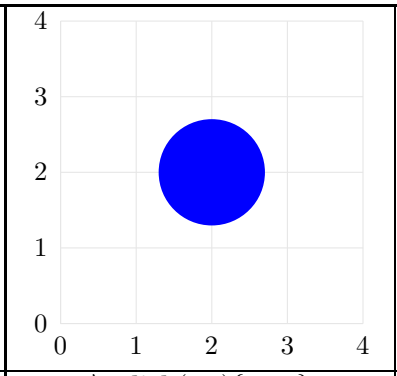
\psarc[showpoints=true]
(1,2){2}{-30}{60}



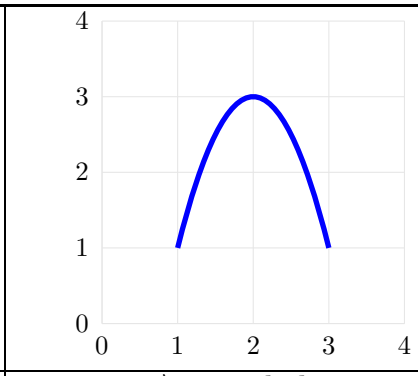
\psbezier[showpoints=true]
(1,0)(4,4)(0,4)(3,0)



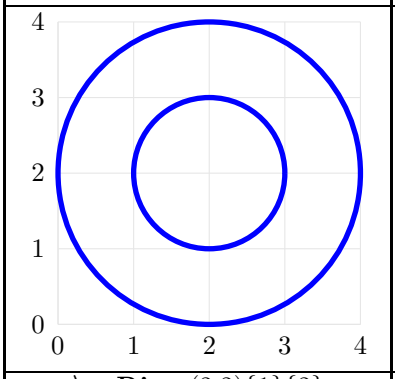
\qline (1,1)(3,3)



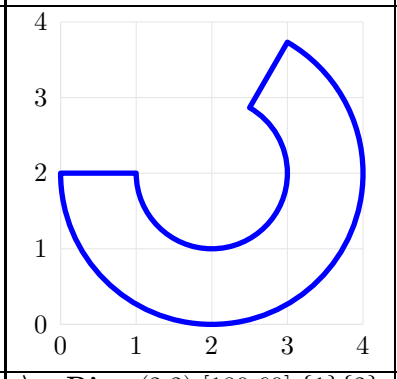
\qdisk(2,2){20pt}



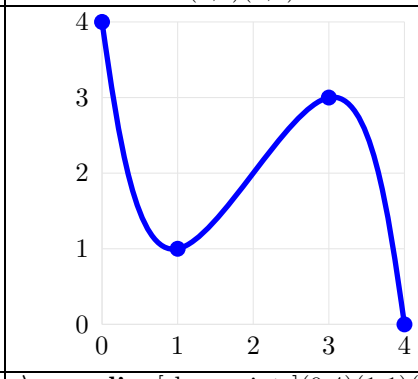
\psparabola
(1,1)(2,3)



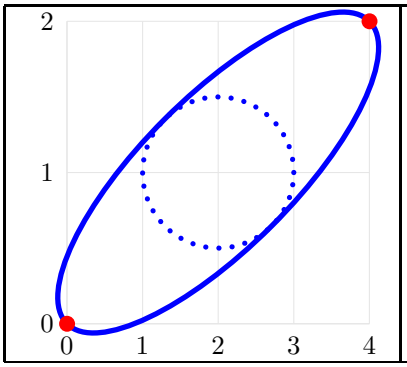
\psRing (2,2){1}{2}



\psRing (2,2) [180,60] {1}{2}

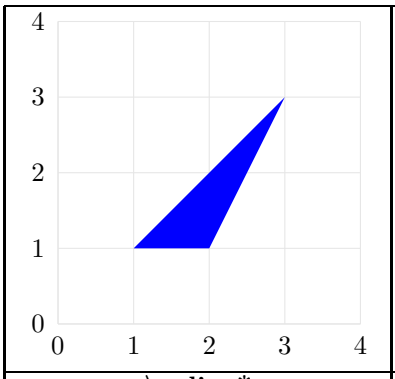


\pscspline[showpoints](0,4)(1,1)(3,3)

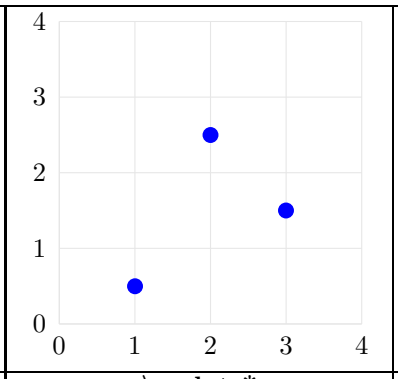


\psellipseAB(0,0)(4,2){1}
\pscircle[linestyle=dotted](2,1){1}
\psdots[linecolor=red](0,0)(4,2)

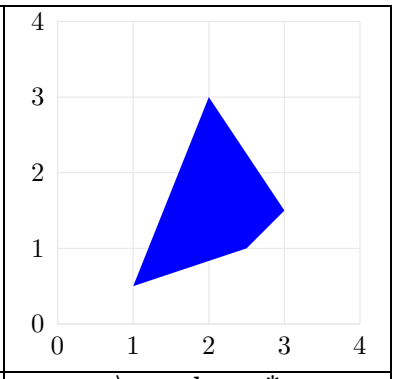
1.2 Commands with asterik



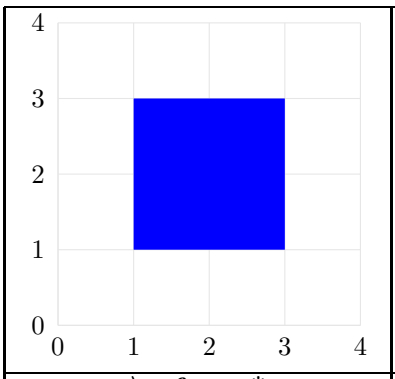
\psline*
(0, 0)(1,1)(2,1)(3,3)



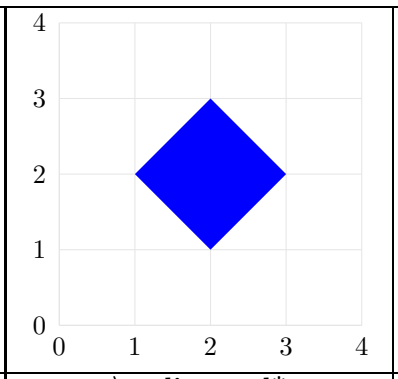
\psdots*
(1,0.5)(2,2.5)(3,1.5)



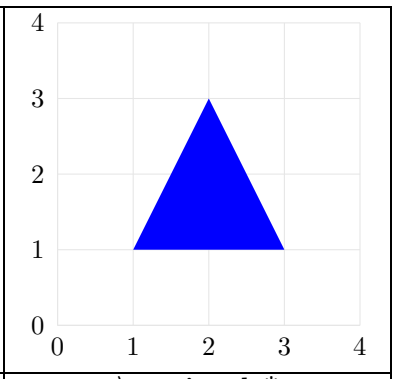
\pspolygon*
(1,0.5)(2,3)(3,1.5)(2.5,1)



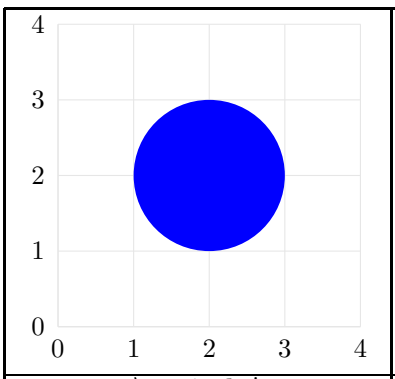
\psframe*
(1, 1)(3, 3)



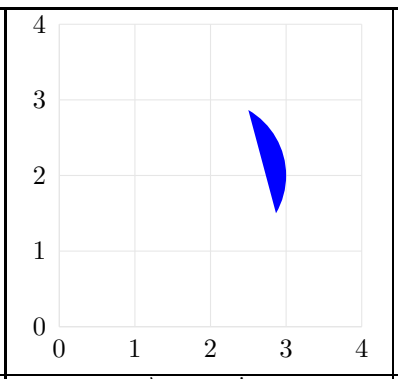
\psdiamond*
(2,2)(1,1)



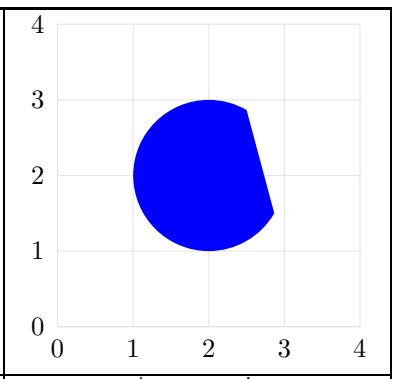
\pstriangle*
(2,1)(2,2)



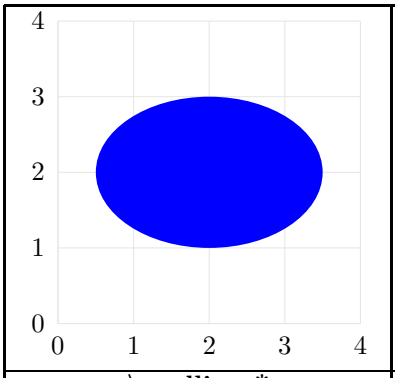
\pscircle*
(2,2){1}



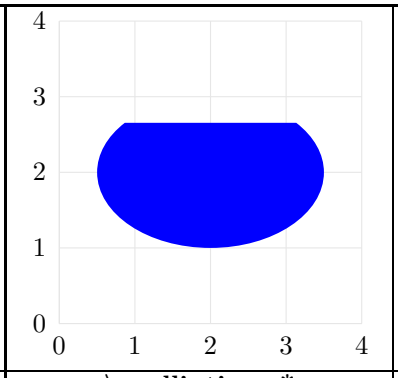
\psarc*
(2,2){1}{-30}{60}



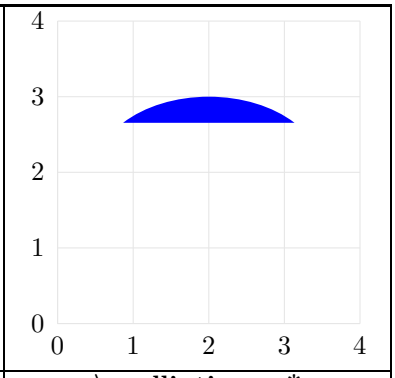
\psarcn*
(2,2){1}{-30}{60}



\psellipse*
(2, 2)(1.5,1)



\psellipticarc*
(2, 2)(1.5,1){150}{30}



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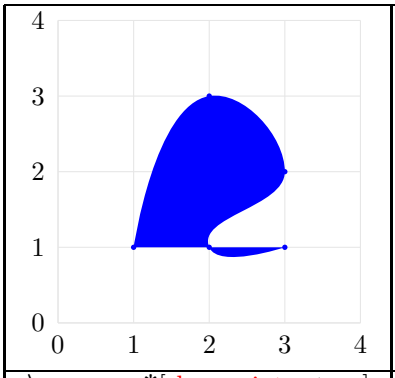
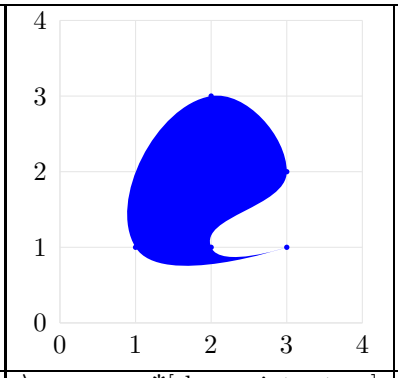
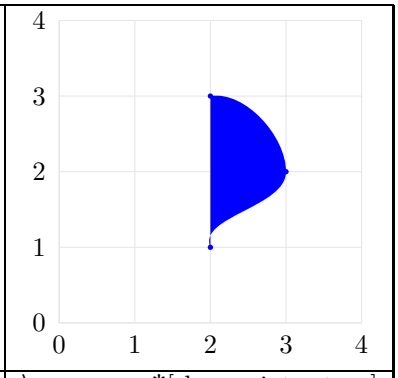
(2, 2)(1.5,1){150}{30}



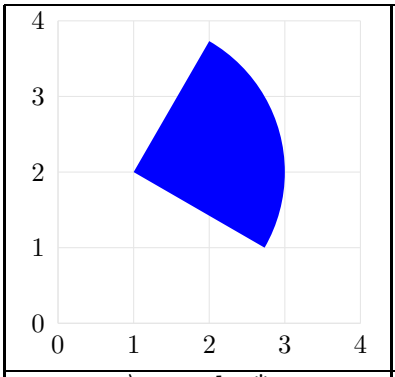
\pscurve*[showpoints=true]
(1,1)(2,3)(3,2)(2,1)(3,1)



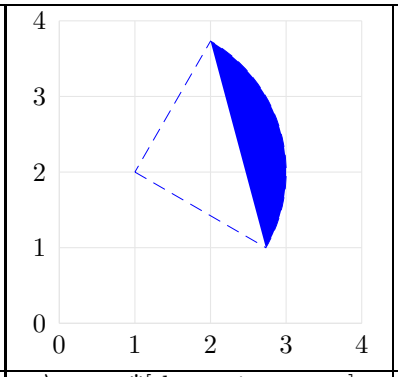
\psccurve*[showpoints=true]
(1,1)(2,3)(3,2)(2,1)(3,1)



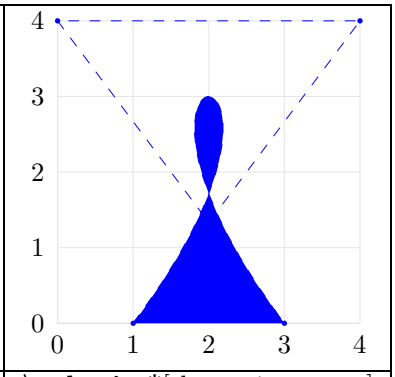
\psecurve*[showpoints=true]
(1,1)(2,3)(3,2)(2,1)(3,1)



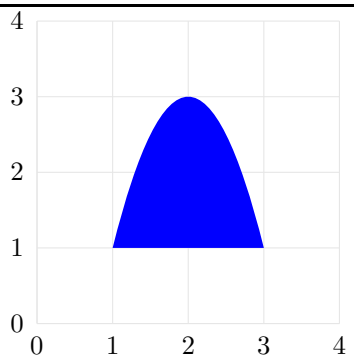
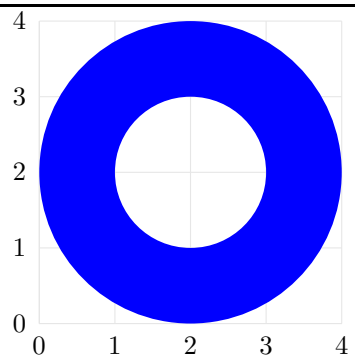
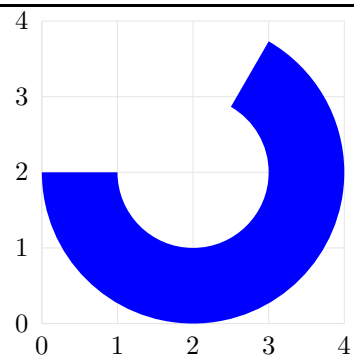
\pswedge*
(1,2){2}{-30}{60}

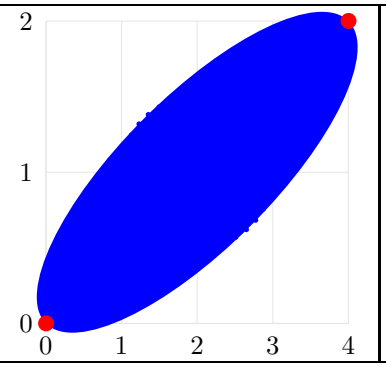


\psarc*[showpoints=true]
(1,2){2}{-30}{60}



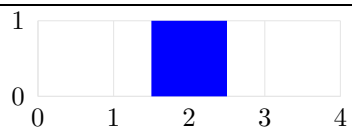
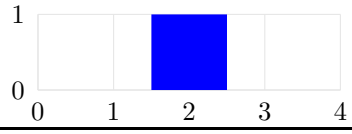
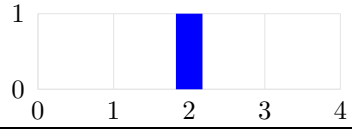
\psbezier*[showpoints=true]
(1,0)(4,4)(0,4)(3,0)

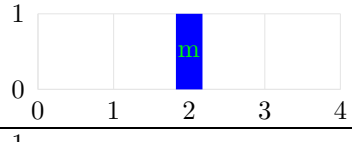
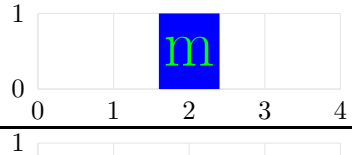
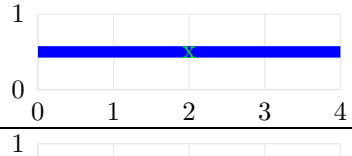
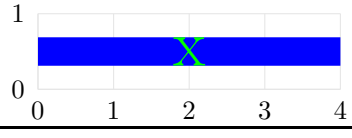
		
\psparabola (1,1)(2,3)	**\psRing** (2,2){1}{2}	**\psRing** (2,2) [180,60] {1}{2}

	**\psellipseAB*** (0,0)(4,2){1} \pscircle[linestyle=dotted](2,1){1} \psdots[linecolor=red](0,0)(4,2)

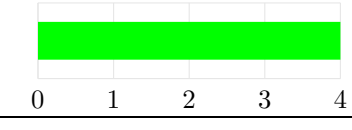
2 Parameters avaliable

2.1 Linewidth

	\psline[linewidth=10mm](2,0)(2,1)
	\psline[linewidth=1cm](2,0)(2,1)
	\psline[linewidth=1in](2,0)(2,1)
	\psline[linewidth=10pt](2,0)(2,1)
By default : linewidth = 0.8pt	

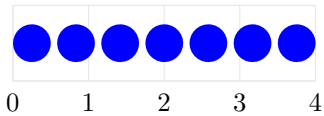
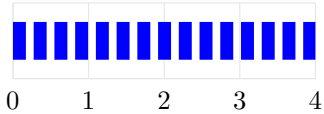
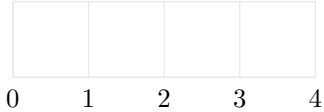
*D*imensions en fonction de la taille de la police	
	\psline[linewidth=1em](2,0)(2,1)
	{**Huge** \psline[linewidth=1em](2,0)(2,1) }
	\psline[linewidth=1ex](0,0.5)(4,0.5)
	{**Huge** \psline[linewidth=1ex](0,0.5)(4,0.5) }

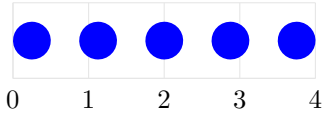
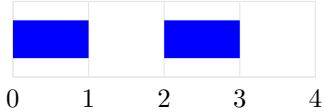
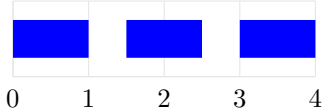
2.2 Line color

	\psline [linewidth=0.5cm,linecolor=green] (4,0)

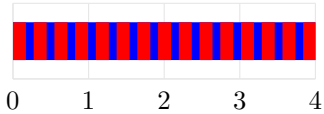
*C*olors available									
black	darkgray	gray	lightgray	white	red	green	blue	cyan	magenta
brown	lime	olive	orange	pink	purple	teal	violet	yellow	
By default : linecolor = black									

2.3 Line style

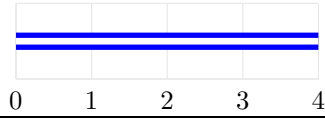
	\psline[linewidth=0.5cm,linestyle= dotted](4,0)
	\psline[linewidth=0.5cm,linestyle= dashed](4,0)
	\psline[linewidth=0.5cm,linestyle= none](4,0)
By default : linestyle = solid	

	\psline[linewidth=0.5cm,linestyle= dotted ,dotsep =1cm](4,0)
	\psline[linewidth=0.5cm,linestyle= dashed ,dash=1cm](4,0)
	\psline[linewidth=0.5cm,linestyle= dashed , dash=1cm 0.5cm](4,0)
By default : dotsep = 3pt dashsep= 5pt 3pt	

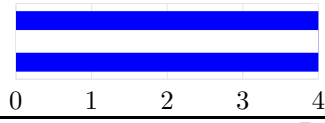
New option : dashcolor [15]

	\psline[linewidth=.5cm,linestyle=dashed,dashcolor=red](0,0)(4,0)
	\psline[linewidth=0.5cm,linestyle=dashed, linecolor=black,dashcolor=black!40,dash=5mm 5mm](0,0)(4,0)

2.4 Double line

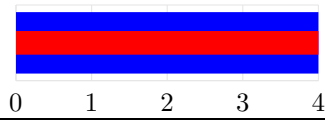



```
\psline[doubleline=true](4,0)
```




```
\psline[linewidth=0.25cm,doubleline=true,doublesep=.3cm](4,0)
```

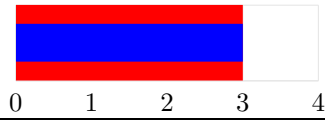
By default : doublesep = 1.25\pslinewidth



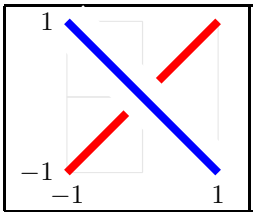

```
\psline[linewidth=0.25cm,doubleline=true,doublecolor=red](4,0)
```

By default : doublecolor = white

2.5 Border

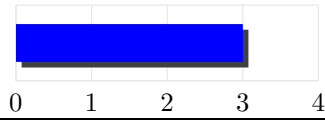



```
\psline[linewidth=0.5cm,border=0.25cm,bordercolor=red](3,0)
```



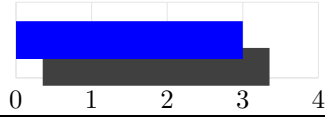

```
\psline[linewidth=3pt,linecolor=red](-1,-1)(1,1)
\psline[linewidth=3pt,linecolor=blue,border==0.25cm](1,-1)(-
1,1)
```

2.6 Shadow



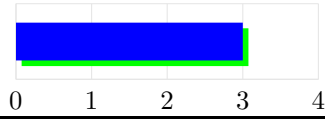

```
\psline[linecolor=red,shadow=true](3,0)
```

By default : shadow = false



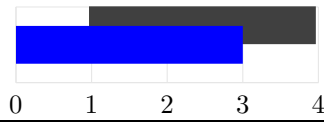

```
\psline[linewidth=.5cm,shadow=true,shadowsize=.5cm](3,0)
```

By default : shadowsize = 3pt




```
\psline[linewidth=.5cm,shadow=true,shadowcolor=green](3,0)
```

By default : shadowcolor = darkgray

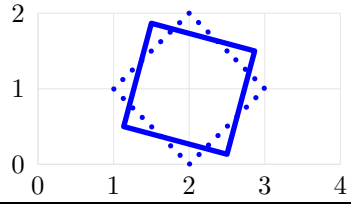



```
\psline[linewidth=.5cm,shadow=true,shadowsize=1cm,
shadowangle=15](3,0)
```

By default : ,shadowangle = - 45

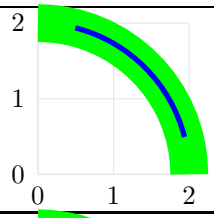
2.7 Specific parameters

\psdiamond

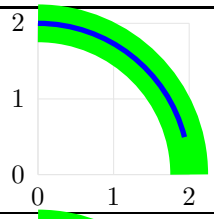



```
\psdiamond[linestyle=dotted](2,1)(1,1)
\psdiamond[gangle=30](2,1)(1,1)
```

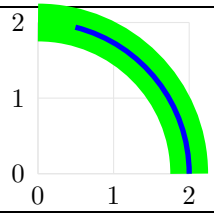
\pssarc




```
\psarc[linecolor=green,linewidth=0.5cm](0,0){2}{0}{90}
\psarc[arcsep=1cm](0,0){2}{0}{90}
```

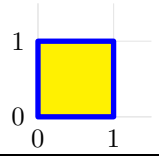



```
\psarc[linecolor=green,linewidth=0.5cm](0,0){2}{0}{90}
\psarc[arcsepA=1cm](0,0){2}{0}{90}
```




```
\psarc[linecolor=green,linewidth=0.5cm](0,0){2}{0}{90}
\psarc[arcsepB=1cm](0,0){2}{0}{90}
```

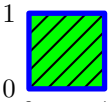
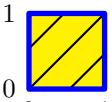
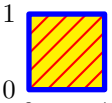
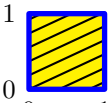
2.8 Filling




```
\psframe[fillstyle=solid](1,1)
```

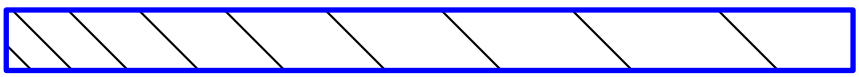
Types de remplissages disponibles						
none	solid	vlines	hlines	crosshatch	penrose	dots
						
		vlines*	hlines*	crosshatch*	penrose*	
						

Options available :

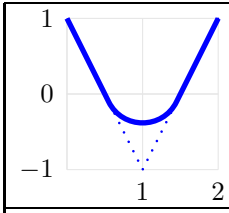
	\psframe[fillstyle=hlines*,fillcolor=green](1,1)
fillcolor = white	
	\psframe[fillstyle=hlines*,hatchwidth=3pt](1,1)
hatchwidth = 0.8pt	
	\psframe[fillstyle=hlines*,hatchsep=10pt](1,1)
hatchsep = 4pt	
	\psframe[fillstyle=hlines*,hatchcolor=red](1,1)
hatchcolor = black	
	\psframe[fillstyle=hlines*,hatchangle=25](1,1)
hatchangle = 45	

New option : hatchwidthinc hatchsepinc [13]

\psframe[fillstyle=vlines,hatchwidthinc=2pt](14,1)

\psframe[fillstyle=vlines,hatchsepinc=2pt](14,1)


2.9 Line arc




```
\psline[linearc=0.5cm](0,1)(1,-1)(2,1)
\psline[linestyle=dotted](0,1)(1,-1)(2,1)
```

By default : linearc = 0

2.10 Dot style

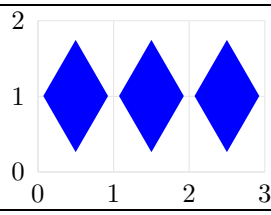
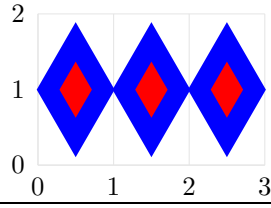
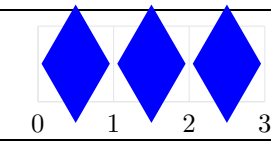
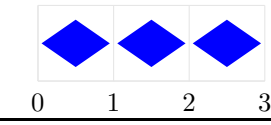
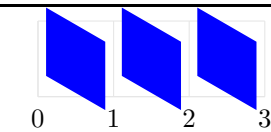
\psdots [dotstyle=pentagon*](.5,0)(1.5,0)(2.5,0)

*		o	
x		+	
Bo		B+	
asterisk		Basterisk	
Asterisk		BoldAsterisk	
SolidAsterisk		oplus	
BoldOplus		SolidOplus	
otimes		|	
square		Bsquare	
square*		diamond	
diamond*		triangle	
Btriangle		triangle*	
pentagon		Bpentagon	
pentagon*		Hexagon	
BoldHexagon		SolidHexagon	
Octogon		BoldOctogon	
SolidOctogon			

By default : dotstyle = *

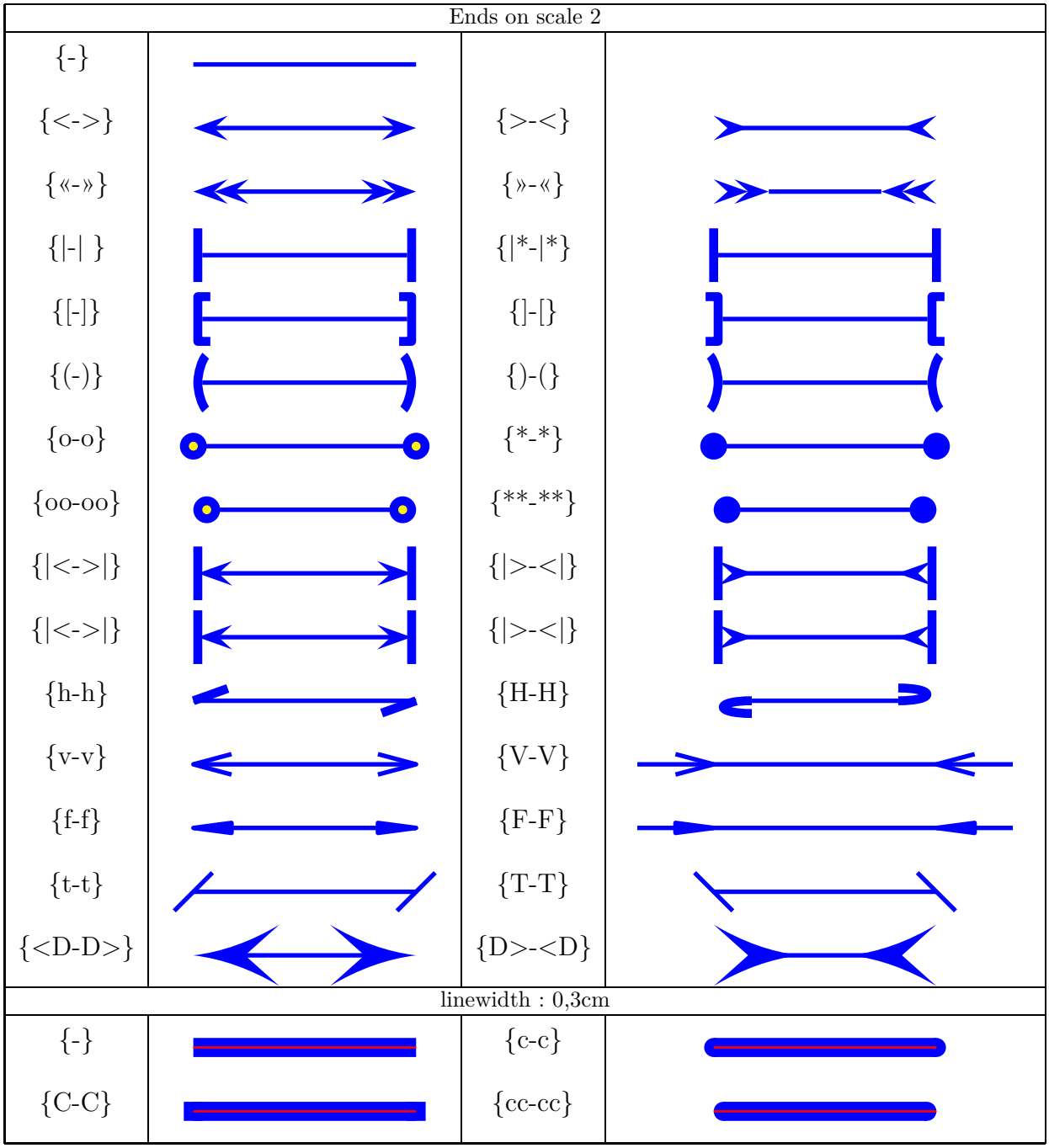
1. linecolor=blue,fillcolor=yellow

2.11 Parameters of the points

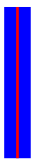
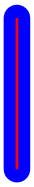
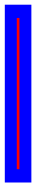
<table>
<tr><td>  </td><td>\psdots[dotstyle=diamond*, dotsize= 1cm] (0.5,0)(1.5,0)(2.5,0)</td></tr>
<tr><td>  </td><td>\psdots[dotstyle=diamond*, dotsize= 0.5cm 10]
(0.5,0)(1.5,0)(2.5,0)
\psdots[linecolor=red,dotstyle=diamond*, dotsize= 0.5cm]
(0.5,0)(1.5,0)(2.5,0)</td></tr>
<tr><td colspan="2">dotsize= 0.5pt 2.5</td></tr>
<tr><td>  </td><td>\psdots[dotstyle=diamond*, dotscale= 5]
(0.5,0)(1.5,0)(2.5,0)</td></tr>
<tr><td>  </td><td>\psdots[dotstyle=diamond*, dotscale= 5 2] (0.5,0)(1.5,0)(2.5,0)</td></tr>
<tr><td colspan="2">dotscale= 1</td></tr>
<tr><td>  </td><td>\psdots[dotstyle=diamond*,dotscale= 5, dotangle= 30]
(0.5,0)(1.5,0)(2.5,0)</td></tr>
<tr><td colspan="2">dotangle= 0</td></tr>
</table>

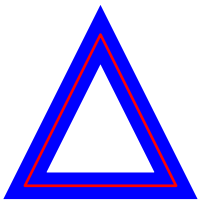
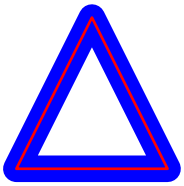
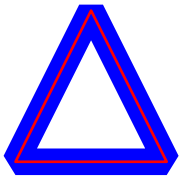
3 Arrowheads and such

3.1 Types of extremities available



3.2 Linejoin linecap [14]

\psline[linecap=0,linewidth=10pt](2,0.5)(2,2.5)		
		
linecap=0	linecap=1	linecap=2

\pstriangle[linejoin=0,linewidth=10pt] (2,0.5)(2,2)		
		
linejoin=0	linejoin=1	linejoin=2

3.3 Multiple arrows

nArrows	
	
\psline[nArrows=5]{»-»}(0.5,0)(5,0)	\psline[nArrows=5]{«-«}(0.5,0)(5,0)

nArrowsA ArrowsB	
	
\psline[nArrowsA=5]{»-»}(0.5,0)(5,0)	\psline[nArrowsB=5]{»-»}(0.5,0)(5,0)
	
\psline[nArrowsA=5]{«-«}(0.5,0)(5,0)	\psline[nArrowsB=5]{«-«}(0.5,0)(5,0)

3.4 Parameters available

	
\psline[Arrowsize=3pt 3]{->}	\psline[arrowlength= 5]{->}
By default : arrowsize= 1.5pt 2	By default : arrowlength= 1.4

\psline[arrowinset=0]{->}

\psline[arrowinset=.8]{->}

By default : arrowinset=.4 (40%)

linewidth=2pt

linewidth=4pt

\psline[tbarsize=4pt 2]{|<-|}

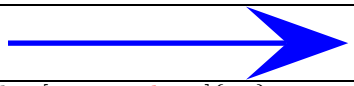
By default : tbarsize=2pt 5

\psline[bracketlength=.5]{-]}

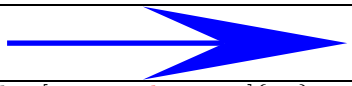
By default : bracketlength= 0.15

\psline[rbracketlength=.5]{-)}

By default : rbracketlength=0.15



\psline[arrowscale=5]{->}



\psline[arrowscale= 5 10]{->}

By default : arrowscale=1

\psline[hooklength=10mm]{-H}

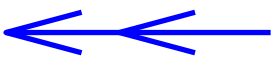
By default : hooklength=3mm

\psline[hookwidth=3mm]{-H}

By default : hookwidth=1mm

\psline[arrowLW=1pt]{o-*}

\psline[arrowLW=1mm]{*-o}



\psline[veearrowlength=.5cm]{v-V}

By default : veearrowlength = 3mm

\psline[veearrowangle=60]{v-V}

By default : veearrowangle = 30

\psline[veearrowlinewidth =.5mm]{v-V}

By default : veearrowlinewidth = 0.35mm

\psline[filledveearrowlength = 5mm]{f-F}

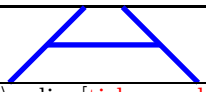
By default : filledveearrowlength = 3mm

\psline[filledveearrowangle = 45]{f-F}

By default : filledveearrowangle = 15

\psline[filledveearrowlinewidth =1mm]{f-F}

By default : filledveearrowlinewidth =0.35mm

	
\psline[tickarrowlength=2.5mm]{t-T}	\psline[tickarrowlinewidth=1mm]{t-T}
By default : tickarrowlength= 1.5mm	By default : tickarrowlinewidth=0.35mm

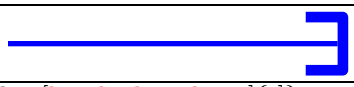
	
\psline[arrowlinestyle=dotted]{t-T}	\psline[arrowlinestyle=dashed]{v-V}
arrowlinestyle= solid	

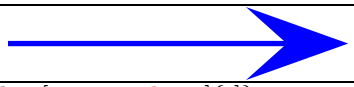
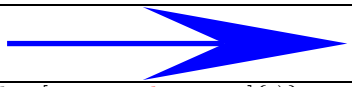
	
\psline[ArrowFill=false,arrowinset=0]{>-<}	\psline[ArrowFill=false]{>-<}

	
\psline[Arrowsize=3]{->}	\psline[arrowlength= 5]{->}
By default : arrowsize= 1.5pt 2	By default : arrowlength= 1.4

	
\psline[arrowinset=0]{->}	\psline[arrowinset=.8]{->}
By default : arrowscale=.4 (40%)	

	
linewidth=2pt	linewidth=4pt
\psline[tbarsize=4pt 2]{|<-|}	By default : tbarsize=2pt 5

	
\psline[bracketlength=.5]{-]}	\psline[rbracketlength=.5]{-)}
By default 0.15	By default 0.15

	
\psline[arrowscale=5]{-]}	\psline[arrowscale= 5 10]{-)}
By default : arrowscale=1	

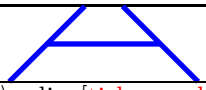
	
\psline[hooklength=10mm]{-H}	\psline[hookwidth=3mm]{-H}
By default : hooklength=3mm	By default : hookwidth=1mm

	
\psline[arrowLW=1pt]{o-*}	\psline[arrowLW=1mm]{*-o}

	
\psline[veearrowlength=.5cm]{v-V}	\psline[veearrowangle=60]{v-V}
By default : veearrowlength = 3mm	By default : veearrowangle = 30

	
\psline[veearrowlinewidth=.5mm]{v-V}	\psline[filledveearrowlength = 5mm]{f-F}
By default : veearrowlinewidth = 0.35mm	By default : filledveearrowlength = 3mm

	
\psline[filledveearrowangle = 45]{f-F}	\psline[filledveearrowlinewidth =1mm]{f-F}
By default : filledveearrowangle = 15	By default : filledveearrowlinewidth =0.35mm

	
\psline[tickarrowlength=2.5mm]{t-T}	\psline[tickarrowlinewidth=1mm]{t-T}
By default : tickarrowlength= 1.5mm	By default : tickarrowlinewidth=0.35mm

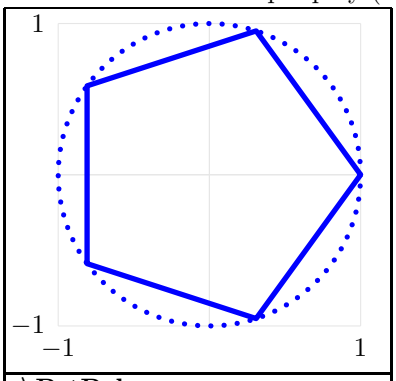
	
\psline[arrowlinestyle=dotted]{t-T}	\psline[arrowlinestyle=dashed]{v-V}
arrowlinestyle= solid	

	
\psline[ArrowFill=false,arrowinset=0]{>-<}	\psline[ArrowFill=false]{>-<}

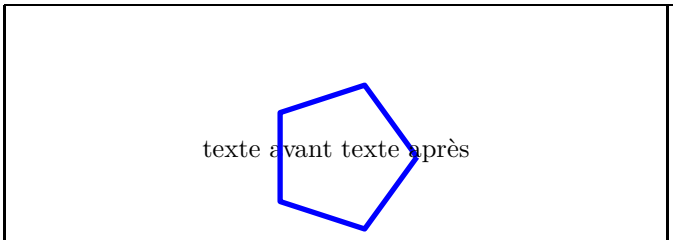
4 Des polygones avec pst poly [19]

5 Plolygons with pstpoly

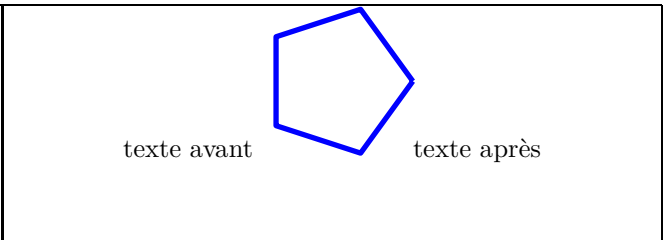
Utilisation du module pst-poly (consultez le fichier pst-poly-doc.pdf)



PstPolygon
\pscircle[linestyle=dotted]{1}

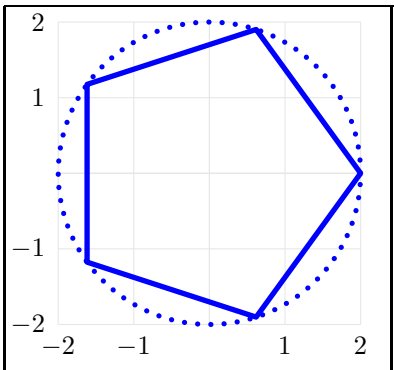


texte avant \PstPolygon[PstPicture=false] texte après

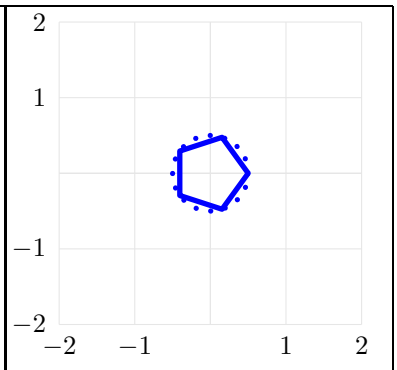


texte avant \PstPolygon[PstPicture=true] texte après

By default : PstPicture=true

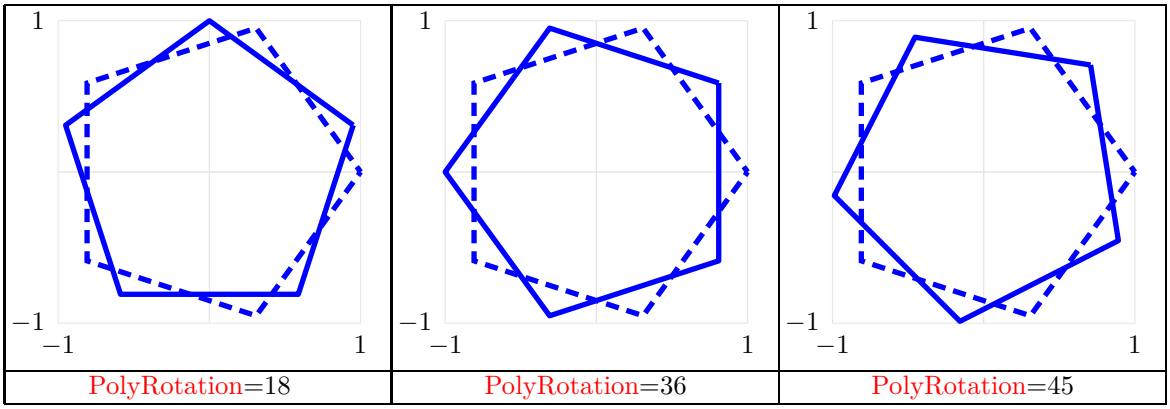


\PstPolygon[unit=2]
\pscircle[linestyle=dotted]{2}

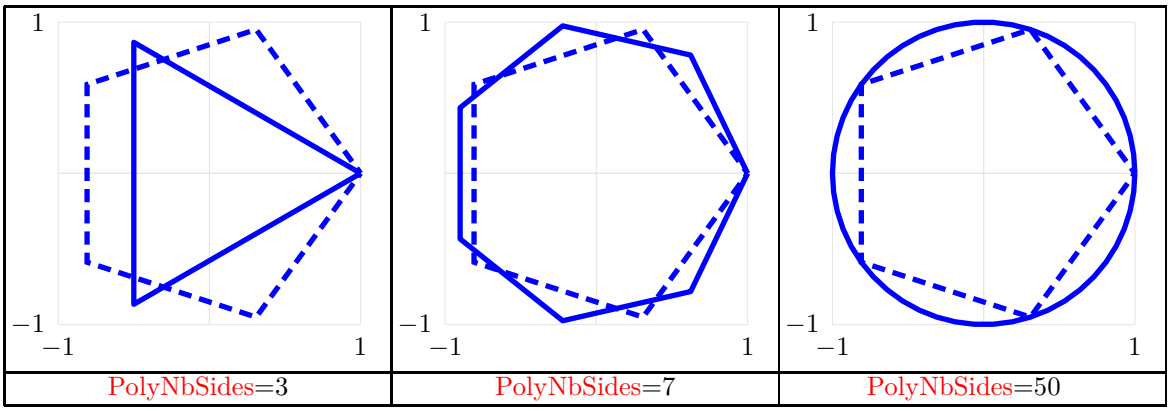


\PstPolygon[unit=.5]
\pscircle[linestyle=dotted]{.5}

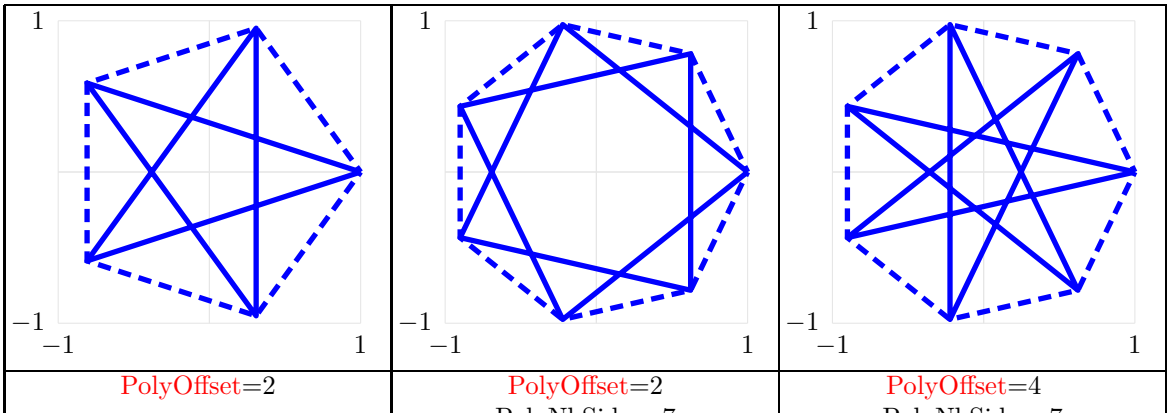
5.1 Options



PolyRotation=18 | PolyRotation=36 | PolyRotation=45

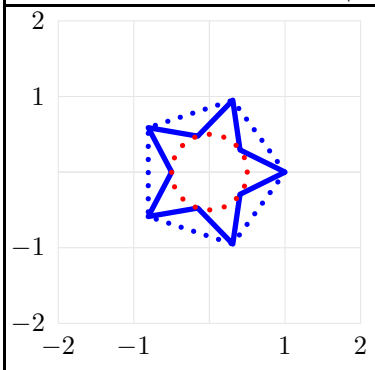


PolyNbSides=3 | PolyNbSides=7 | PolyNbSides=50

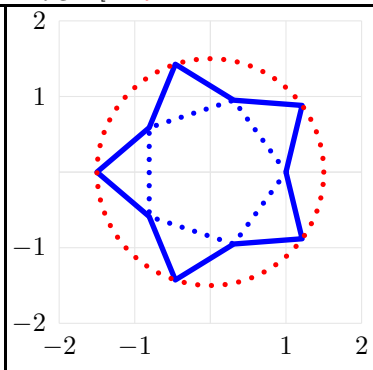


PolyOffset=2 | PolyOffset=2 PolyNbSides=7 | PolyOffset=4 PolyNbSides=7

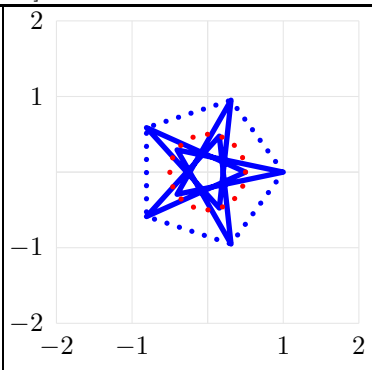
\PstPolygon[PolyIntermediatePoint=0.5]



[PolyIntermediatePoint=0.5]
\pscircle{0.5}

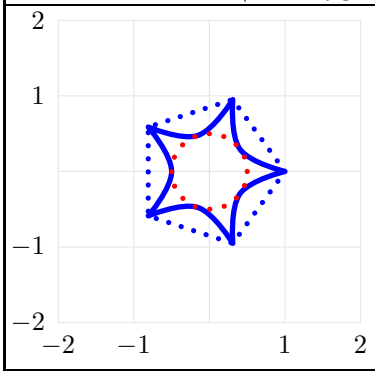


[PolyIntermediatePoint=1.5]
\pscircle{1.5}

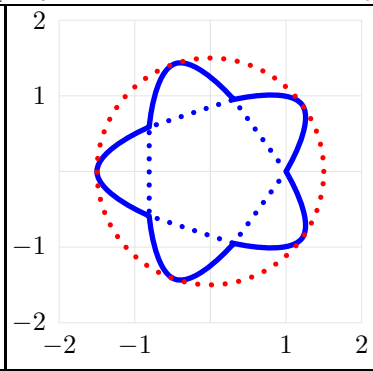


[PolyIntermediatePoint=-0.5]
\pscircle{.5}

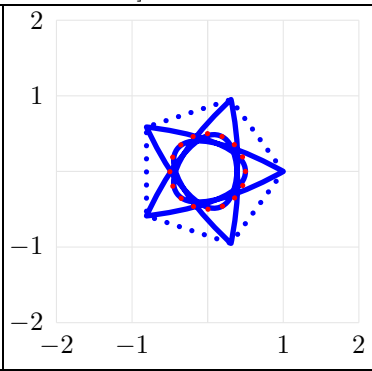
\PstPolygon[PolyIntermediatePoint=0.5,PolyCurves=true]



[PolyIntermediatePoint=0.5]
\pscircle{0.5}

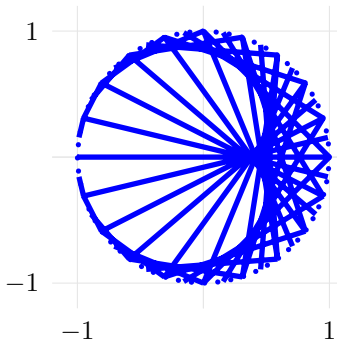


[PolyIntermediatePoint=1.5]
\pscircle{.5}

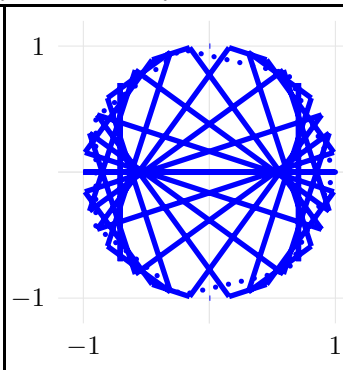


[PolyIntermediatePoint=-0.5]
\pscircle{.5}

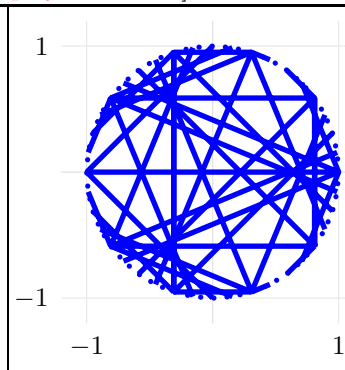
\PstPolygon[PolyOffset=2,PolyNbSides=40,PolyEpicycloid=true]



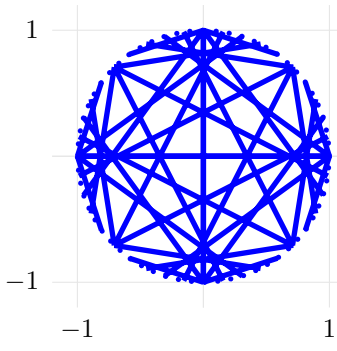
PolyOffset=2



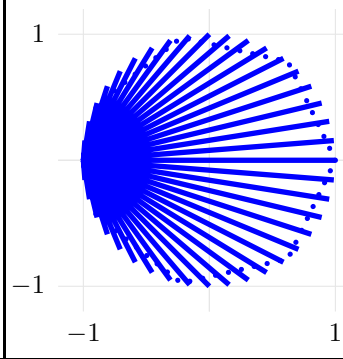
PolyOffset=3



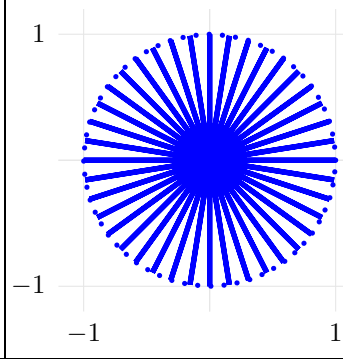
PolyOffset=4



PolyOffset=5

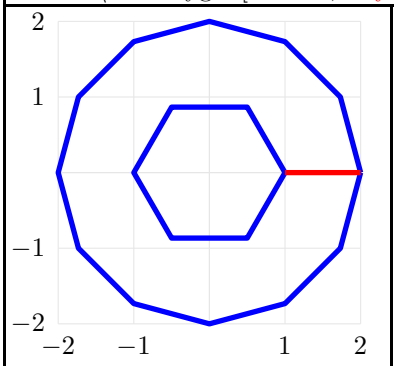


PolyOffset=40

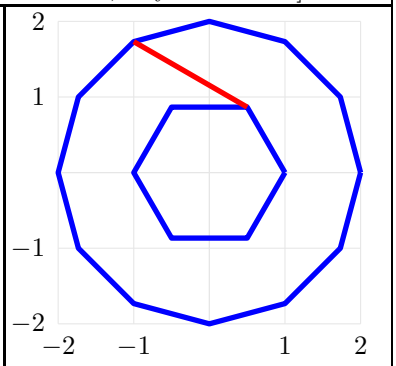


PolyOffset=41

\PstPolygon[unit=1,PolyName=A,PolyNbSides=6]
\PstPolygon[unit=2,PolyName=B,PolyNbSides=6]

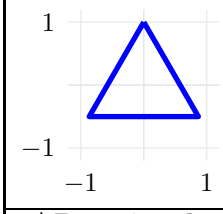
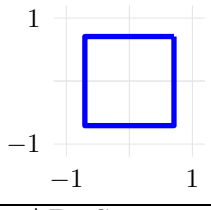
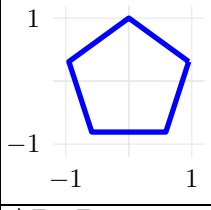
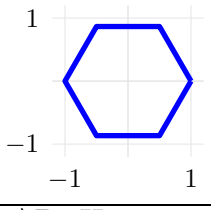
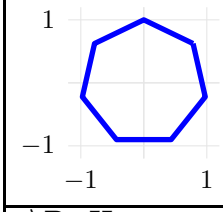
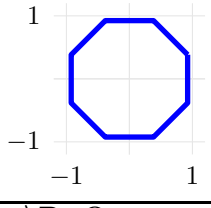
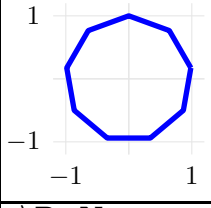
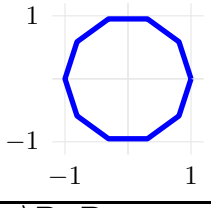
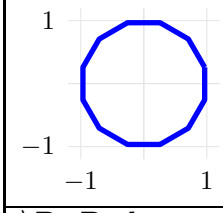
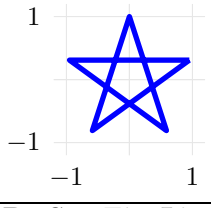
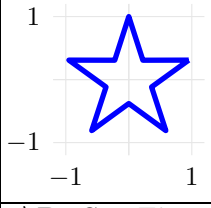


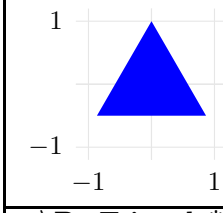
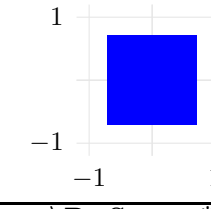
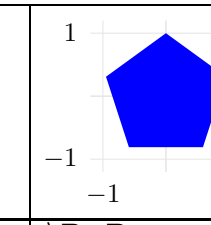
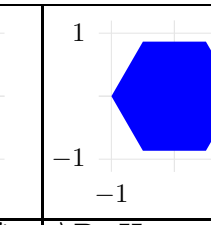
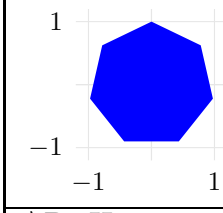
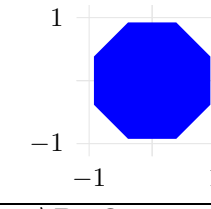
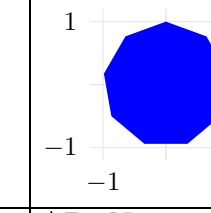
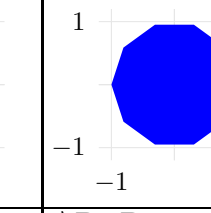
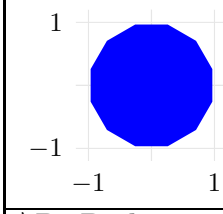
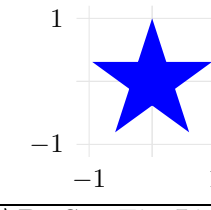
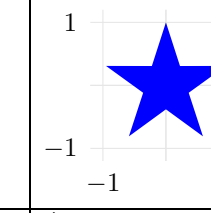
\psline(A1)(B1)

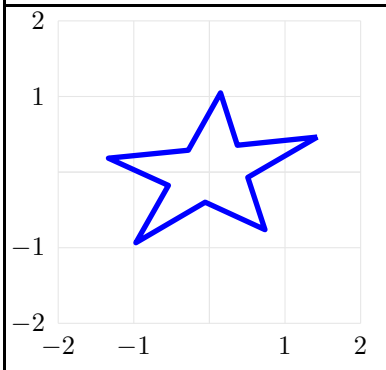
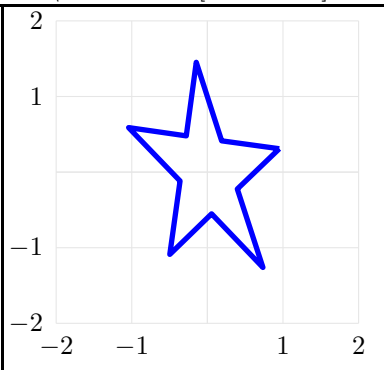
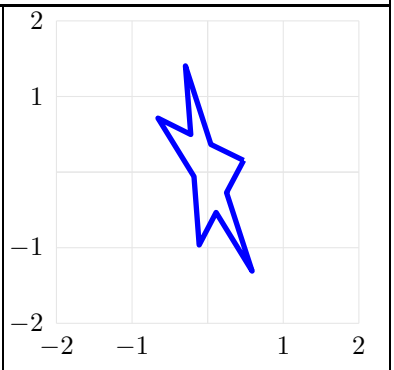


\psline(A2)(B5)

5.2 Predefined polygon

			
\PstTriangle	\PstSquare	\PstPentagon	\PstHexagon
			
\PstHeptagon	\PstOctogon	\PstNonagon	\PstDecagon
			
\PstDodecagon	\PstStarFiveLines	\PstStarFive	

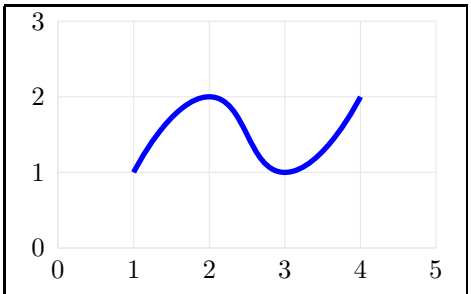
			
\PstTriangle*	\PstSquare*	\PstPentagon*	\PstHexagon*
			
\PstHeptagon*	\PstOctogon*	\PstNonagon*	\PstDecagon*
			
\PstDodecagon*	\PstStarFiveLines*	\PstStarFive*	

\PstStarFive[xunit=1.5]		
		
xunit=1.5	yunit=1.5	xunit=0.5,yunit=1.5

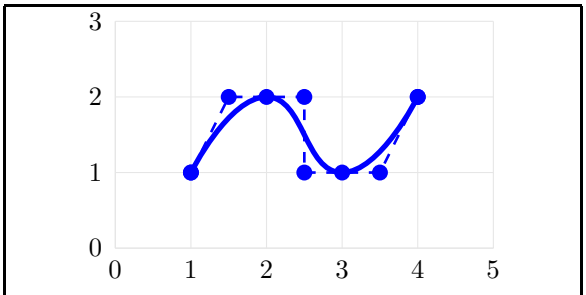
6 Bezier Curves

Package « **pst-bezier** »

6.1 psbcurve command

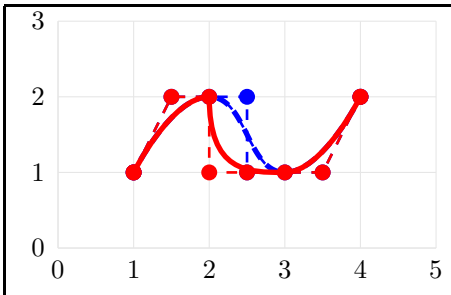


psbcurve(1,1)(2,2)(3,1)(4,2)

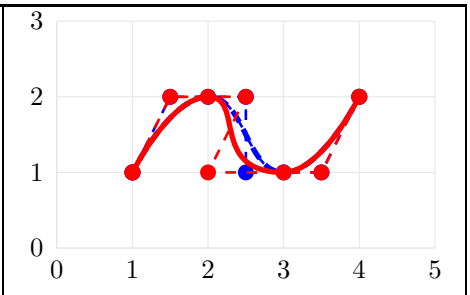


\psbcurve[showpoints=true](1,1)(2,2)(3,1)(4,2)

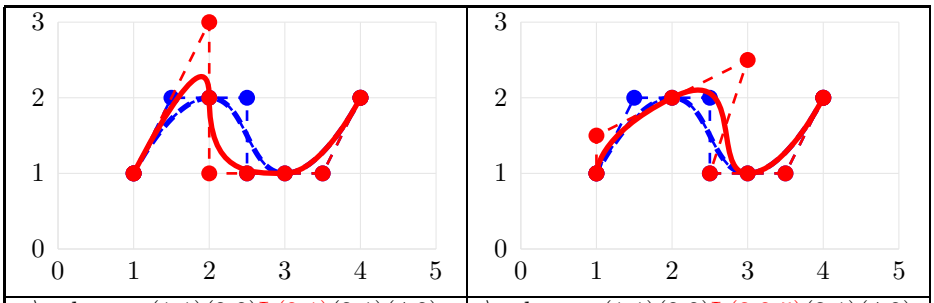
6.2 Modificators



\psbcurve(1,1)(2,2)l(2,1)(3,1)(4,2)

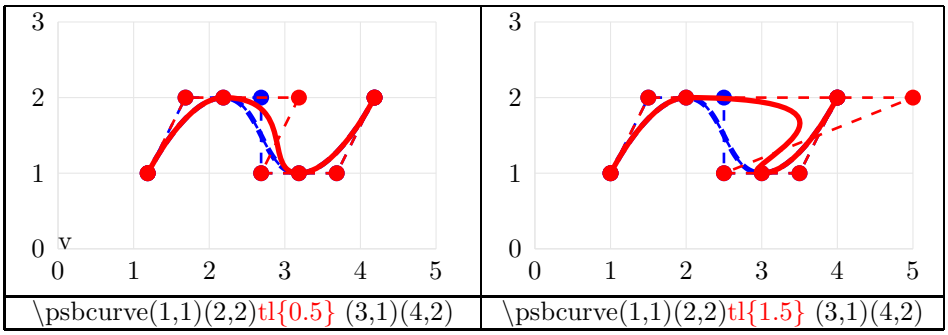


\psbcurve(1,1)(2,2)r(2,1)(3,1)(4,2)



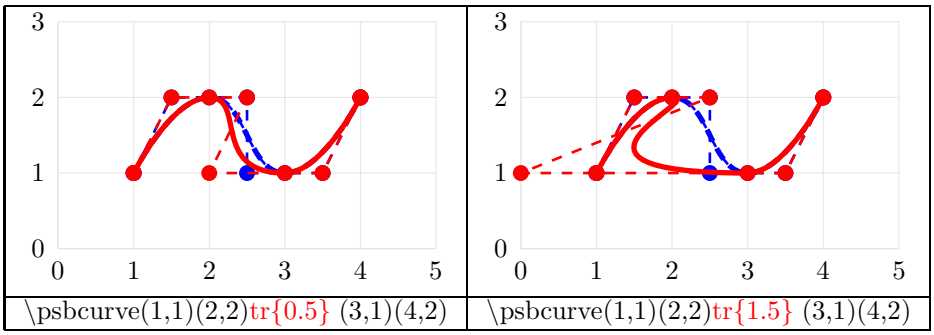
\psbcurve(1,1)(2,2)L(2,1)(3,1)(4,2)

\psbcurve(1,1)(2,2)L(3,2.5)(3,1)(4,2)



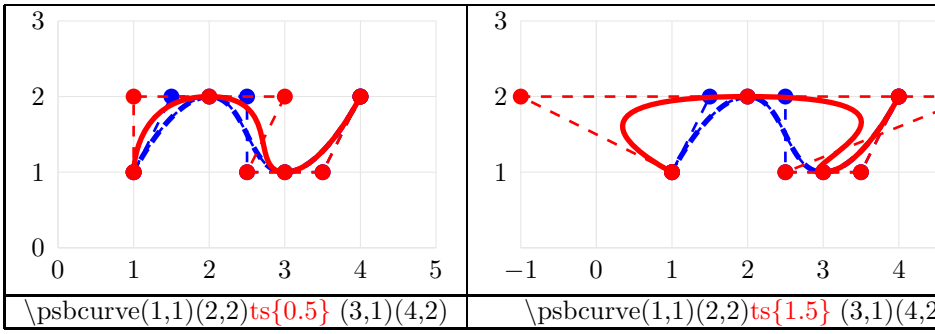
\psbcurve(1,1)(2,2)tl{0.5} (3,1)(4,2)

\psbcurve(1,1)(2,2)tl{1.5} (3,1)(4,2)



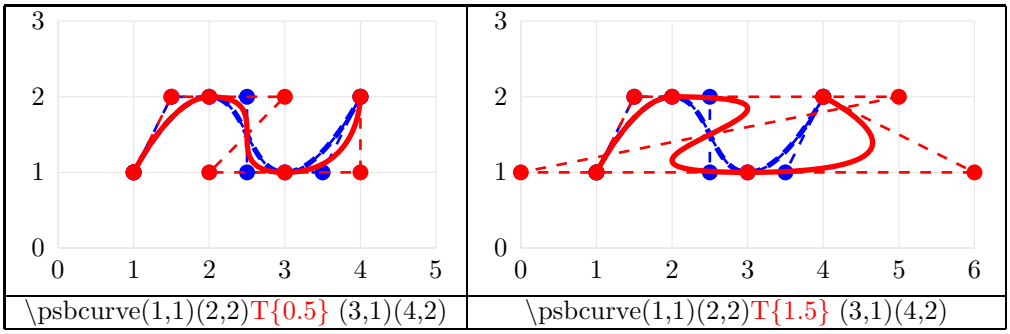
\psbcurve(1,1)(2,2)tr{0.5} (3,1)(4,2)

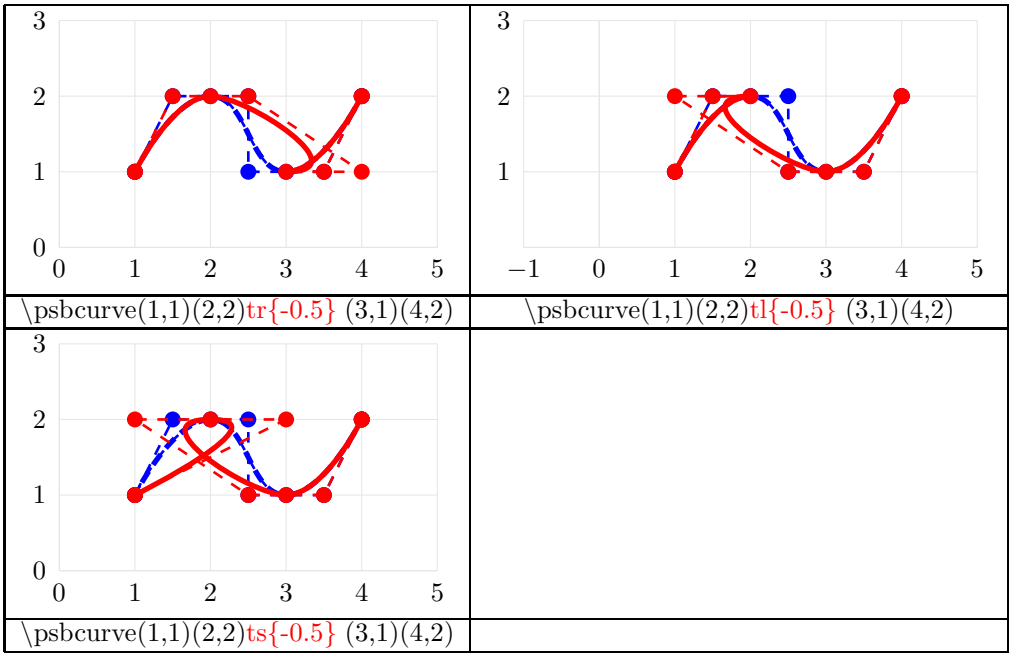
\psbcurve(1,1)(2,2)tr{1.5} (3,1)(4,2)



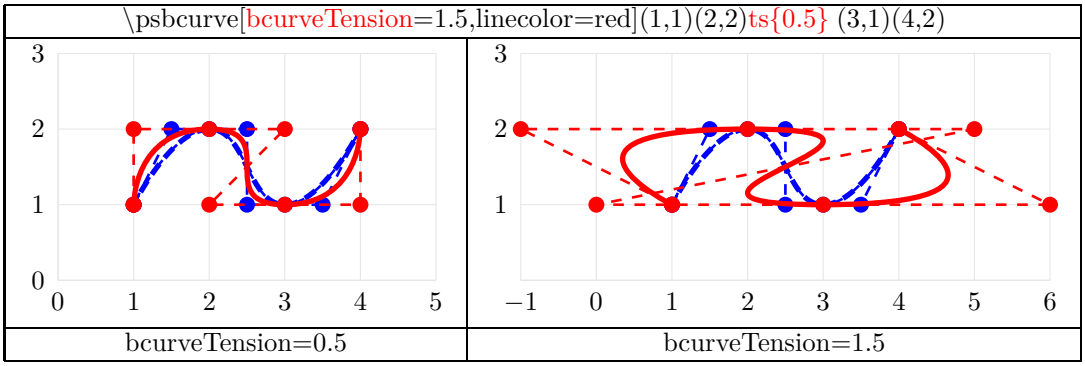
\psbcurve(1,1)(2,2)ts{0.5} (3,1)(4,2)

\psbcurve(1,1)(2,2)ts{1.5} (3,1)(4,2)

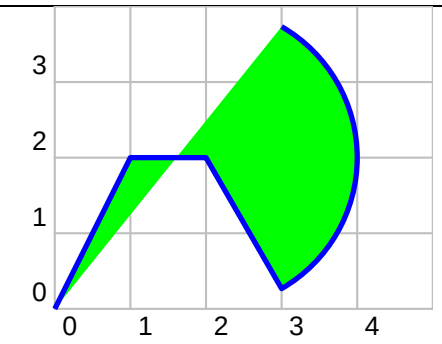




6.3 bcurveTension parameter

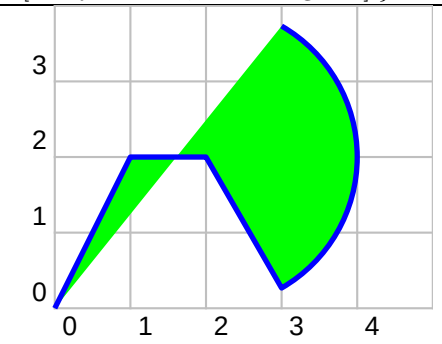


7 Path PSTricks

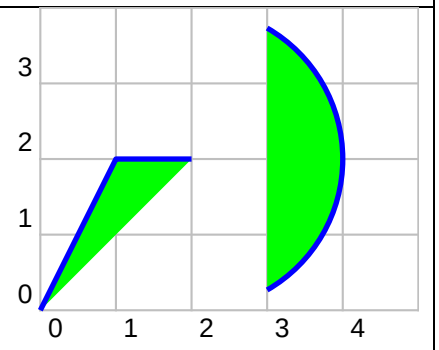



```
\pscustom[linecolor=blue]{
\psline[linecolor=red ](0,0)(1,2)
\psarc[linestyle=dashed](2,2){2}{-60}{60}
\fill[fillstyle=solid,fillcolor=green]
}
```

```
\pscustom { \psline(0,0)(1,2)(2,2) \psarc[liftpen=1](2,2){2}{-60}{60}
\fill[fillstyle=solid,fillcolor=green] }
```

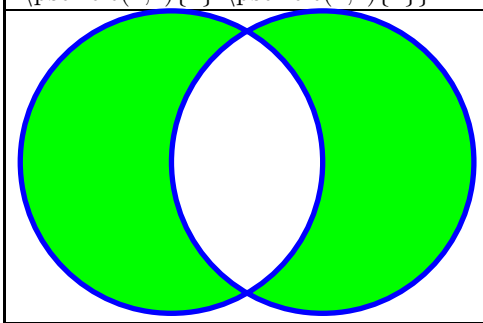


liftpen=1

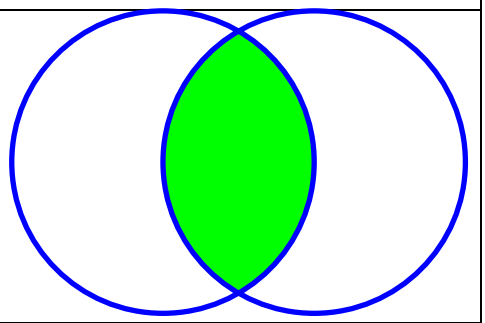


liftpen=2

```
\pscustom[fillstyle=eofill,fillcolor=green]{
\pscircle(2,2){2} \pscircle(4,2){2}}
```



fillstyle= eofill

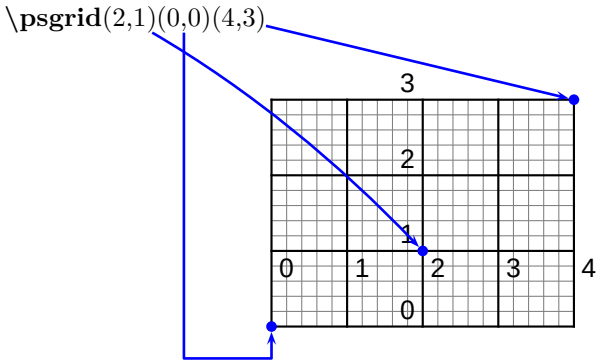


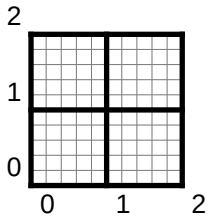
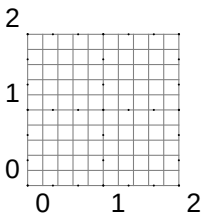
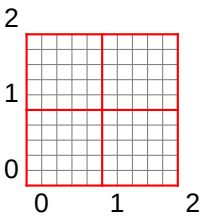
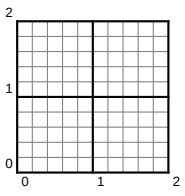
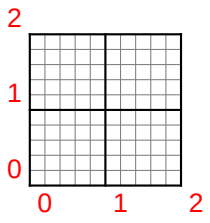
fillstyle= oefill

8 coordinates

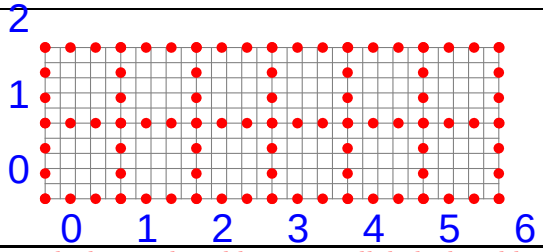
8.1 Grids

\psgrid(2,1)(0,0)(4,3)

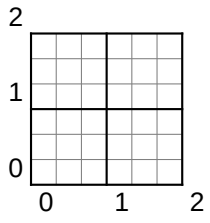
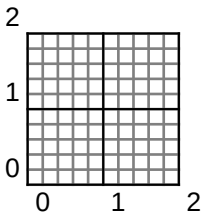
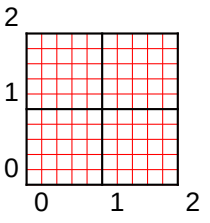
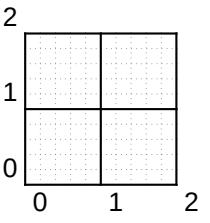


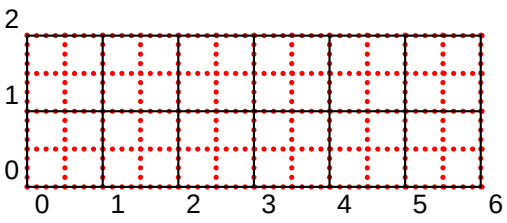
Main grid				
				
gridwidth= 2pt	griddots=3	gridcolor=red	gridlabels=5pt	gridlabelcolor=red
By default : .8pt	By default : 0	By default : black	By default : 10pt	By default : black

Example :



\psgrid[gridwidth=4pt,gridcolor=red,griddots=3,gridlabelcolor=blue,gridlabels=15pt](6,2)

secondary grid			
			
subgriddiv=3	subgridwidth=1pt	subgridcolor=red	subgriddots=3
By default : 5	By default : .4pt	By default : gray	By default : 0



\psgrid[subgriddiv=2,subgridwidth=1pt,subgridcolor=red,subgriddots=3](6,3)

8.2 Coordinate systems

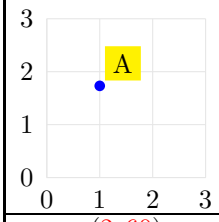
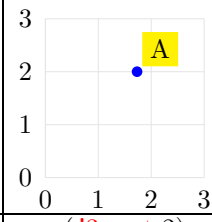
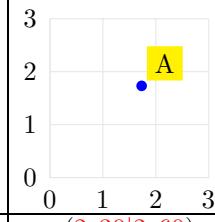
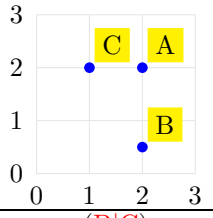
8.2.1 Default

Cartesian coordinates : (x,y) . (the origin is the current position)

8.2.2 Other coordinate systems

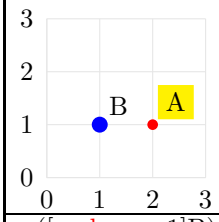
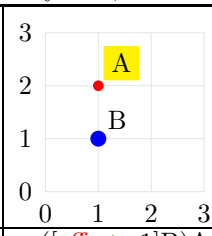
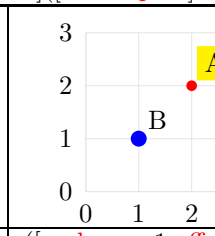
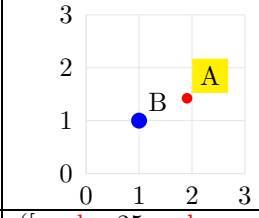
— Activated with the command **\SpecialCoor**
— Desactivated with the command **\NormalCoor**

\dotnode*[dotstyle=*](2;60){A} \nput*{45}{A}{A}

polar	calculated [1]	(coor1|coor2)	(coor1|coor2)
			
(2;60)	(!3 sqrt 2)	(2;30|2;60)	(B|C)

8.2.3 Relative position

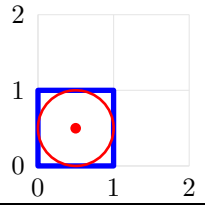
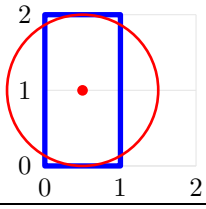
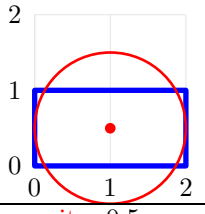
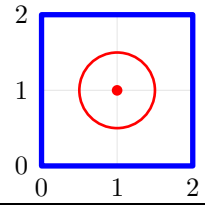
\dotnode*[dotstyle=*,linecolor=red]([nodesep=1]B){A} \nput*{45}{A}{A}

			
([nodesep=1]B)	([offset=1]B)A	([nodesep=1,offset=1]B)	([angle=25,nodesep=1]B)

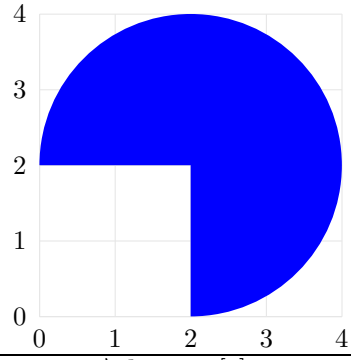
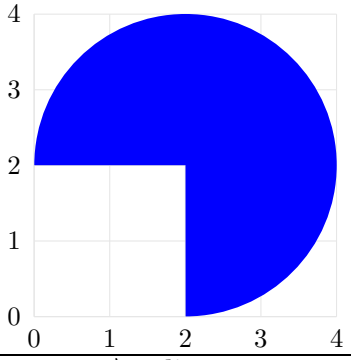
1. formula in the PostScript language

8.3 Changing default units

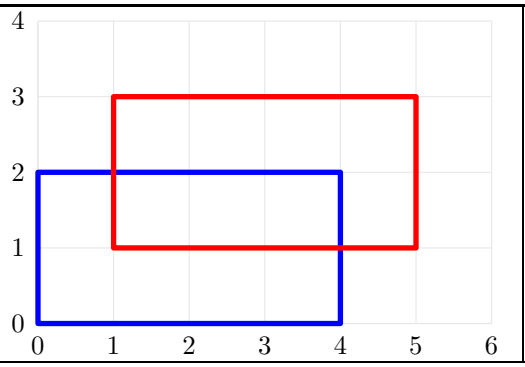
8.3.1 Changing the units of length

\psset{unit=0.5cm}	\psframe(2,2)	\psdots(1,1)	\pscircle(1,1){1}
			
unit= 0.5cm	xunit= 0.5cm	yunit= 0.5cm	runit= 0.5cm
By default : unit= xunit = yunit = runit = 1cm			

8.3.2 Changing the unit of angles

angle expressed as a percentage	angles in radians
	
\degrees[1] \pswedge*(0,0)2{-0.25}{0.50}	**\radians** \pswedge*(0,0)2{1.57}{\psPi}

8.4 Change of origin



\psframe[linewidth=2pt](4,2)
\psframe[linewidth=2pt,linecolor=red,
origin={1,1}](4,2)

8.5 Permutation of the axes

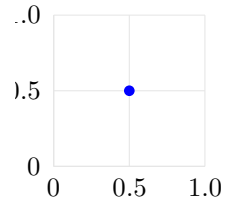
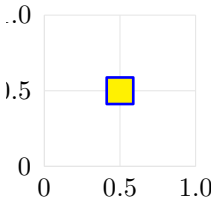
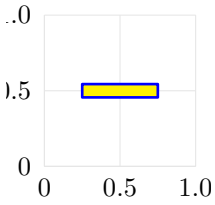
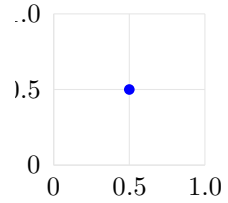
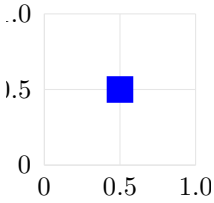
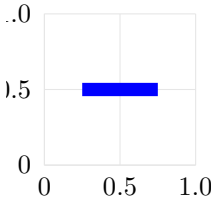
\psset{swapaxes=true} \psframe(2,1)	
	
\psset{swapaxes=true}	\psset{swapaxes=false} (By default)

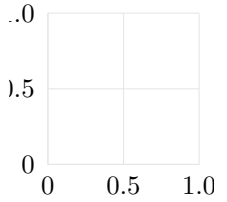
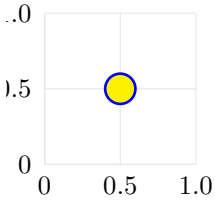
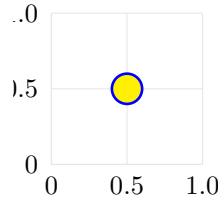
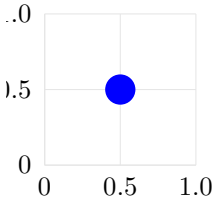
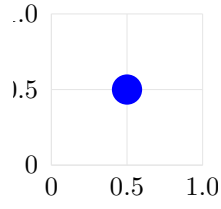
9 Nodes

Utilisation du module **pst-node**

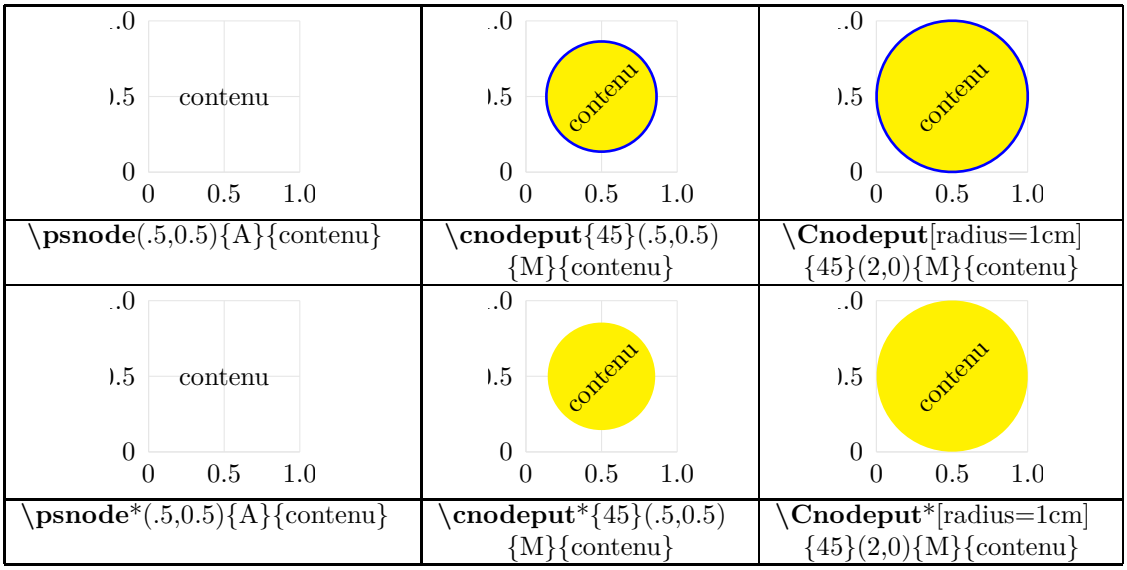
9.1 Types of nodes

9.1.1 With coordinates [1]

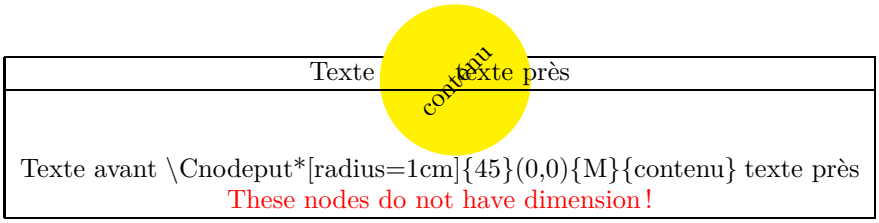
		
\dotnode(.5,0.5){A}	\fnode(.5,0.5){B}	\fnode[framesize=.5 5pt](.5,0.5){B}
		
\dotnode*(.5,0.5){A}	\fnode*(.5,0.5){B}	\fnode*[framesize=.5 5pt](.5,0.5){B}

		
\pnode(.5,0.5){A}	\cnode(.5,0.5){.2cm}{A}	\Cnode[radius=.2cm](.5,0.5){A}
		
	\cnode*(.5,0.5){.2cm}{A}	\Cnode*[radius=.2cm](.5,0.5){A}

1. fillcolor=yellow,linecolor=blue

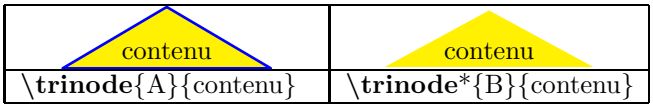


\psnode(.5,0.5){A}{contenu}	\cnodeput{45}(.5,0.5) {M}{contenu}	\Cnodeput[radius=1cm] {45}(2,0){M}{contenu}
\psnode*(.5,0.5){A}{contenu}	\cnodeput*{45}(.5,0.5) {M}{contenu}	\Cnodeput*[radius=1cm] {45}(2,0){M}{contenu}



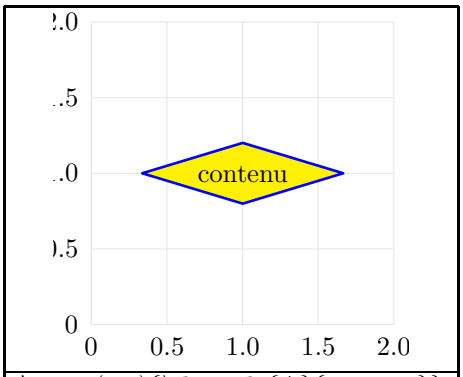
9.2 Without coordinates

contenu	contenu	contenu
\rnode{A}{contenu}	\Rnode{B}{contenu}	\rnode{C}{\psframebox{contenu}}
	contenu	contenu
	\Rnode*{B}{contenu}	\rnode{C}{\psframebox*{contenu}}



\trinode{A}{contenu}	\trinode*{B}{contenu}

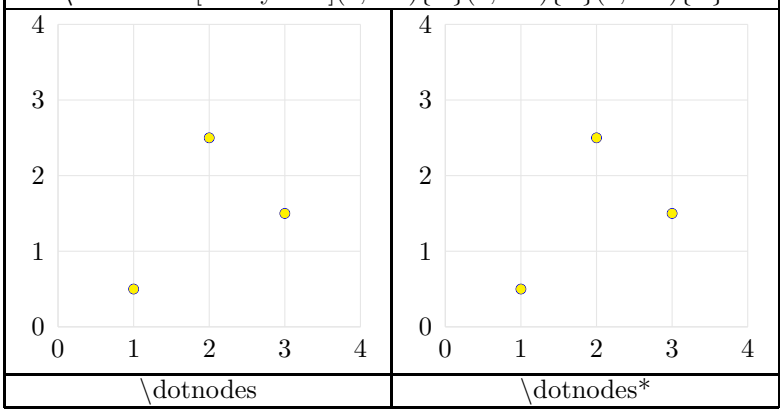
Texte avant \dianode{A}{contenu} texte près



rput(1,1){\dianode{A}{contenu}}

9.2.1 Création de nœuds multiples

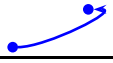
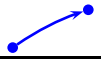
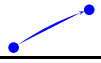
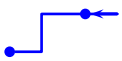
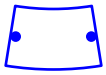
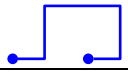
dotnodes[dotstyle=o](1, 0.5){A}(2, 2.5){B}(3, 1.5){C}



\dotnodes | \dotnodes*

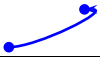
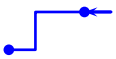
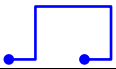
9.3 Connections between nodes

9.3.1 Types of connections available [2]

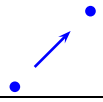
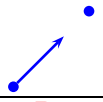
	without asterisk	with asterisk
\ncline{->}{A}{B}		
\nccurve{->}{A}{B}		
\ncarc{->}{A}{B}		
\ncbar{->}{A}{B}		
\ncdiag{->}{A}{B}		
\ncdiagg{->}{A}{B}		
\ncangle{->}{A}{B}		
\ncangles{->}{A}{B}		
\nccircle{->}{A}{.3cm}		
\ncbox{->}{A}{B}	boxsize	
\ncarcbox{->}{A}{B}		
\ncloop{->}{A}{B}		

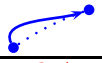
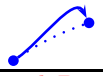
2. fillcolor=white,linecolor=blue

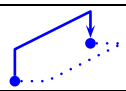
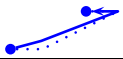
9.3.2 Nodes as points

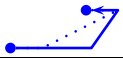
	without asterisk	with asterisk
\pcline{->}(A)(B)		
\pccurve{->}(A)(B)		
\pcarc {->}(A)(B)		
\pcbar{->}(A)(B)		
\pcdiag{->}(A)(B)		
\pcdiagg {->}(A)(B)		
\pcangle{->}(A)(B)		
\pcangles{->}(A)(B)		
\pcbox{->}(A)(B)		
\pcarcbox{->}(A)(B)		
\pcloop {->}(A)(B)		

9.3.3 Options available

\ncline[nodesep=.3cm]{->}{A}{B}		
		
nodesep=0.3cm	nodesepA=0.2cm	nodesepB=0.4cm
By default : 0pt	By default : 0pt	By default : 0pt

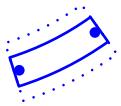
\ncarc[arcangle=90]{->}{A}{B}		
		
arcangle=90	arcangleA=90	arcangleB=90
By default : 8	By default : 8	By default : 8
only for \ncarc !		

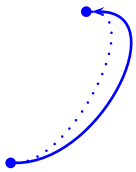
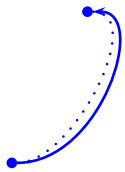
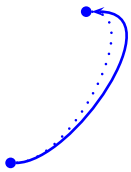
\ncdiag[angle=90]{->}{A}{B}		
		
angle=90	angleA=15	angleB=180
By default : 0	By default : 0	By default : 0

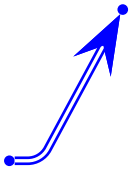
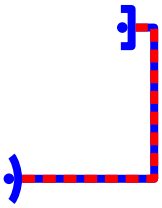
\ncdiag[arm=1cm]{->}{A}{B}		
		
arm=1cm	armA=1cm	armB=1cm
By default : 10pt	By default : 10pt	By default : 10pt

		
\ncline[offset=5pt]{->}{A}{B} \ncline[offset=5pt]{->}{B}{A}	\ncline[offsetA=5pt]{->}{A}{B} \ncline[linestyle=dotted]{A}{B}	\ncline[offsetB=5pt]{->}{A}{B} \ncline[linestyle=dotted]{A}{B}
By default : 0pt	By default : 0pt	By default : 0pt


\ncloop[loopsize=2cm]{A}{B}
By default : 1 cm

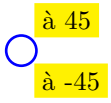
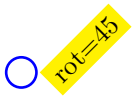

\ncarcbox[boxsize=.2]{A}{B}
By default : 0.4cm
only for \ncbox et \ncarcbox !

		
\nccurve[ncurv=1]{->}{A}{B}	\nccurve[ncurvA=1]{->}{A}{B}	\nccurve[ncurvB=1]{->}{A}{B}
By default : 0.67	By default : 0.67	By default : 0.67
only for \nccurve et \pccurve !		

personalization of the connections	
	
\ncdiagg[linearc=.3cm,doubleline=true, arrowscale=2]{->}{A}{B}	\ncbar[linestyle=dashed,linewidth=3pt, dashcolor=red]{}-[}{A}{B}

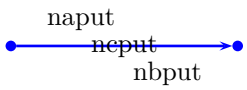
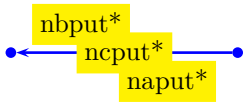
9.4 Labels

9.4.1 Labels on the nodes [3]

syntaxe : \nput*[paramètres]{position=angle}{nom}{texte}		
\nput	 texte	`\nput{0}{A}{texte}`
\nput*		`\nput*{0}{A}{texte}`
position=angle		`\nput*{45}{A}{à 45}`
labelsep		`\nput*[labelsep=0.5cm]{0}{A}{texte}`
labelsep		`\nput*[labelsep=-0.1cm]{0}{A}{texte}`
rot		`\nput*[rot=45]{0}{A}{rot=45}`

3. fillcolor=yellow,linecolor=blue

9.4.2 Labels on the connections

naput ncput nbput		\ncline{->}{A}{B}**naput**[npos=.3]{naput} \ncline{->}{A}{B}**ncput**{ncput} \ncline{->}{A}{B}**nbput**[npos=.7]{nbput}
naput* ncput* nbput*		\ncline{->}{B}{A}\naput*[npos=.3]{naput} \ncline{->}{B}{A}\ncput*{ncput} \ncline{->}{B}{A}\nbput*[npos=.7]{nbput}
[nrot=90]		\ncline{->}{B}{A}\naput*[nrot=90]{naput} \ncline{->}{B}{A}\naput*[nrot=90]{naput} \ncline{->}{B}{A}\nbput*[nrot=90]{nbput}

9.5 Mathematicals and graphs

9.5.1 Creation of the diagram

A B

C D

```
\psmatrix
A & B \\
C & D \\
\endpsmatrix
```

9.5.2 10 types of nodes

R	r			
[mnode= R] R	[mnode= r] r	[mnode= C] C	[mnode= f] f	[mnode= p] p
circle	oval	dia	tri	
[mnode= circle] circle	[mnode= oval] oval	[mnode=dia] dia	[mnode= tri] tri	[mnode= dot] dot

```
\psmatrix[mnode=tri]
A & B & & D \\
& & C & E \\
\endpsmatrix
```

A B D C E

```
\psmatrix[emnode=tri]
A & B & & D \\
& & C & E \\
\endpsmatrix
```

A B D C E

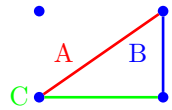
9.5.3 Connection of the nodes

R r

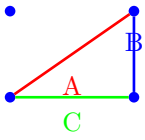
circle oval dia tri

```
\ncline[linecolor=red]{1,2}{2,1}
\ncline[linecolor=blue]{1,1}{2,1}
\ncline[linecolor=cyan]{1,1}{2,2}
```

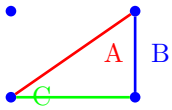
9.5.4 Labels on connections



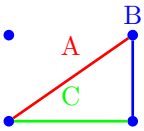

```
\ncline{1,2}{2,1}<{A}
\ncline{1,2}{2,2}<{B}
\ncline{2,1}{2,2}<{C}
```




```
\ncline{1,2}{2,1}_{A}
\ncline{1,2}{2,2}_{B}
\ncline{2,1}{2,2}_{C}
```



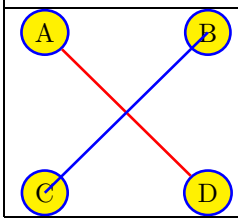

```
\ncline{1,2}{2,1}>{A}
\ncline{1,2}{2,2}>{B}
\ncline{2,1}{2,2}>{C}
```




```
\ncline{1,2}{2,1}^{A}
\ncline{1,2}{2,2}^{B}
\ncline{2,1}{2,2}^{C}
```

9.5.5 Other parameters

name




```
\psmatrix[mnode= oval]
[name=A] A & [name=B] B \\
[name=C] C & [name=D] D \\
\endpsmatrix
\ncline[linecolor=red]{A}{D}
\pcline[linecolor=blue](B)(C)
```

mcol By default : mcol=c

paramètres Position du noeud

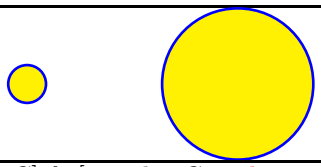
mcol=l A

mcol=c B

mcol=r C

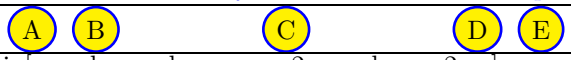
```
\psmatrix[rowsep=.2cm,colsep=.2cm]
paramètres & Position du noeud \\
mcol=l & [mnode= oval,mcol=l] A \\
mcol=c & [mnode= oval,mcol=c] B \\
mcol=r & [mnode= oval,mcol=r] C \\
\endpsmatrix
```

radius

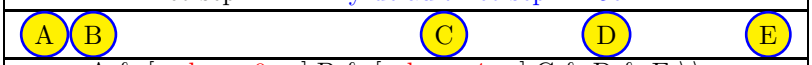


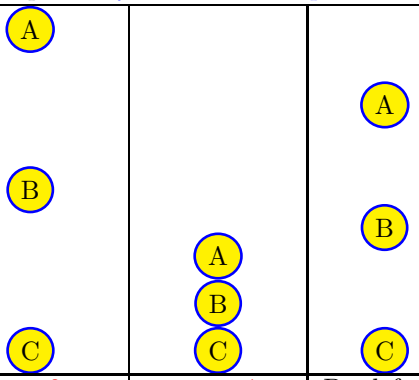
```
\psmatrix [mnode=C] & [mnode=C, radius=1cm]  \endpsmatrix
```

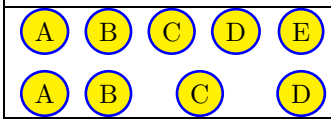
mnodesize By default : mnodesize= -1pt



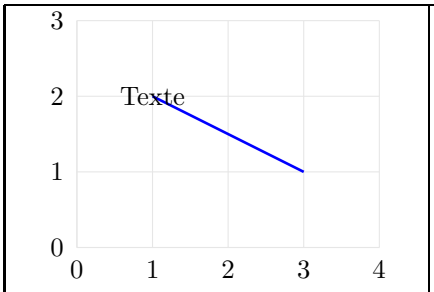

```
\psmatrix[mnode=oval,rowsep=.2cm,colsep=.2cm]
A & B & [ mnodesize=4cm] C & D & E
\endpsmatrix
```

colsep By default : colsep= 1.5cm

A & [colsep=0cm] B & [colsep=4cm] C & D & E \\

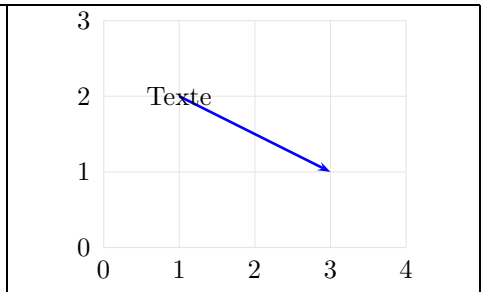
rowsep By default : rowsep= 1.5cm		
		
rowsep=0cm	rowsep=1cm	By default

\psspan	
	A & B & C & D & E \ \ A & B & C \psspan{2} & D \ \

9.6 comments to a graphic

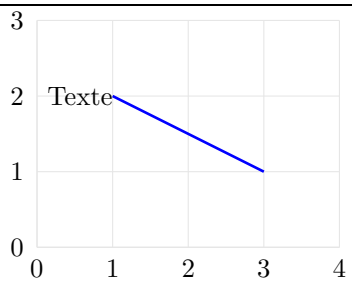


\psComment(1,2)(3,1){Texte}

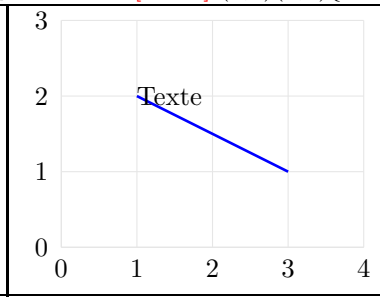


\psComment{->} (1,2)(3,1){Texte}

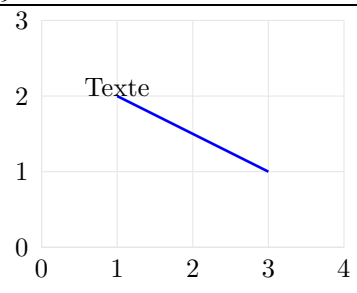
\psComment[ref=r] (1,2)(3,1){Texte}



[ref=r]

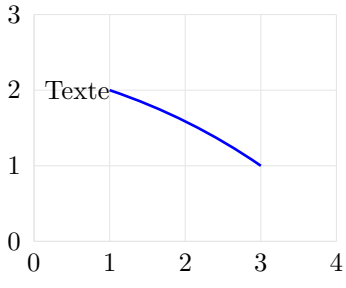


[ref=l]

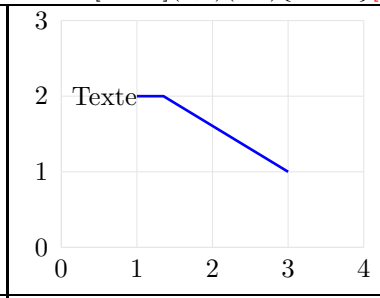


[ref=B]

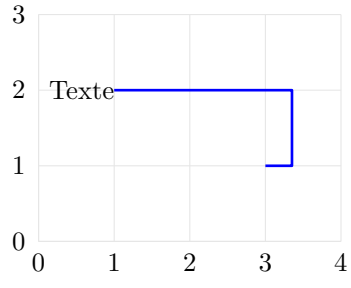
\psComment[ref=r](1,2)(3,1){Texte}[\ncarc]



[\ncarc]



[\ncdiagg]



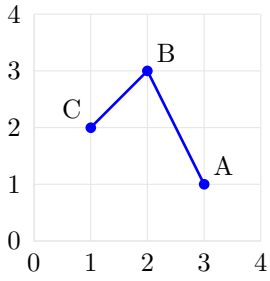
[\ncbar]

A voir : problème avec le deuxième paramètre final [\ncput]

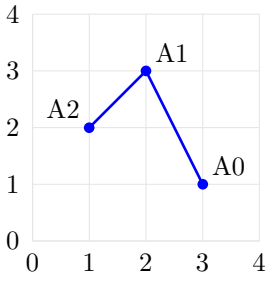
10 Particular constructions

See also the package of geometry on page 181

10.1 Multiples nodes creation



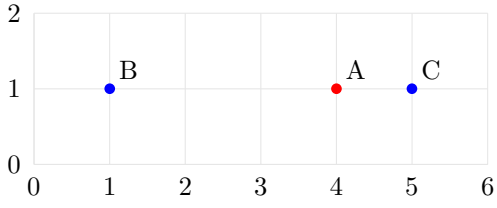
\pnodes(3,1){A}(2,3){B} (1,2){C}
\psline (A) (B) (C)



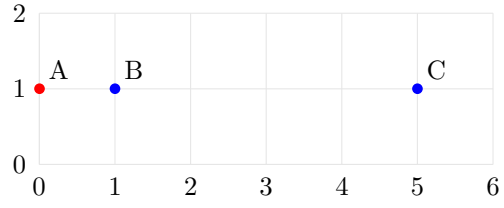
\pnodes{A} (3,1)(2,3) (1,2)
\psline (A0) (A1) (A2)

10.2 Node positions calculated

10.2.1 Relative position width psLNode

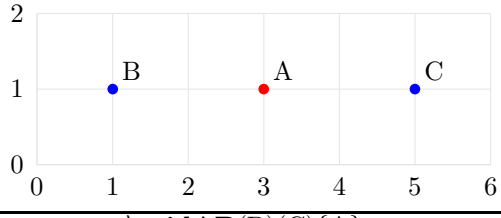


\psLNode(B)(C){0.75}{A}



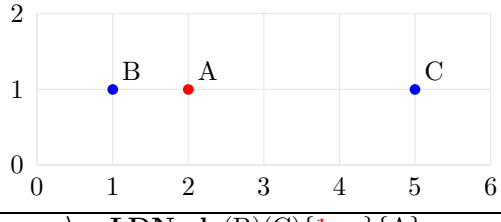
\psLNode(B)(C){-0.25}{A}

10.2.2 Relative position width midAB



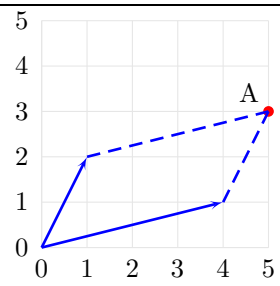
\midAB(B)(C){A}

10.2.3 Position width psLDNode

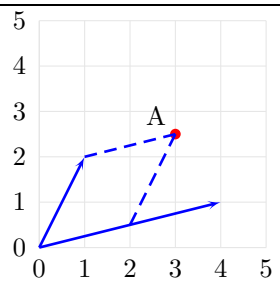


\psLDNode(B)(C){1cm}{A}

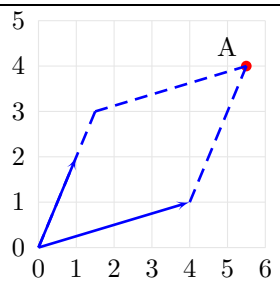
10.2.4 Relative position width psLCNode



\psLCNode(4,1){1}(1,2){1}{A}

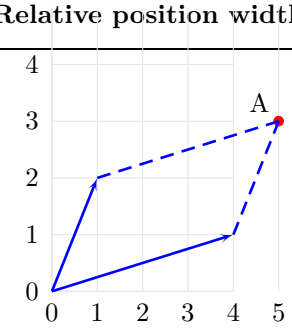


\psLCNode(4,1){.5}(1,2){1}{A}

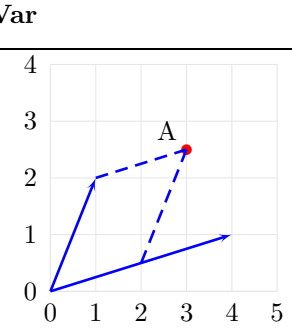


\psLCNode(4,1){1}(1,2){1.5}{A}

10.2.5 Relative position width psLCNodeVar

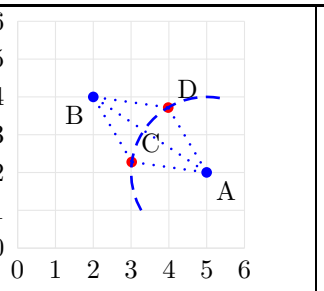


\psLCNodeVar(4,1)(1,2)(1,1){A}

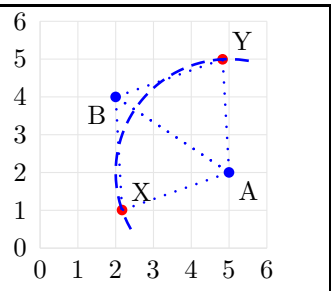


\psLCNodeVar(4,1)(1,2)(0.5,1){A}

10.2.6 Relative position width rhombus

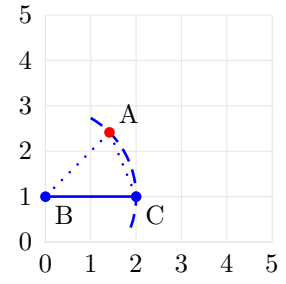


\rhombus{2}(A)(B){C}{D}

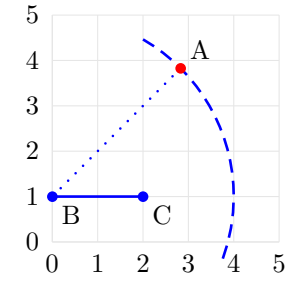


\rhombus{3}(A)(B){X}{Y}

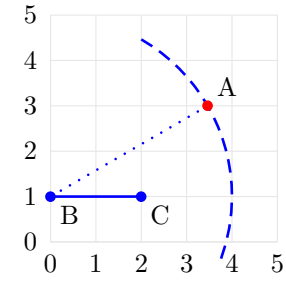
10.2.7 Relative position width psRelNodeVar



\psRelNodeVar(B)(C)(1;45){A}

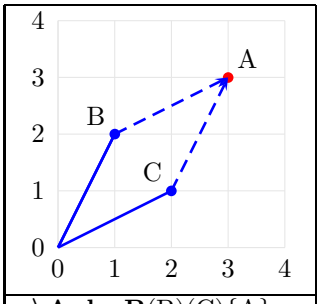


\psRelNodeVar(B)(C)(2;45){A}



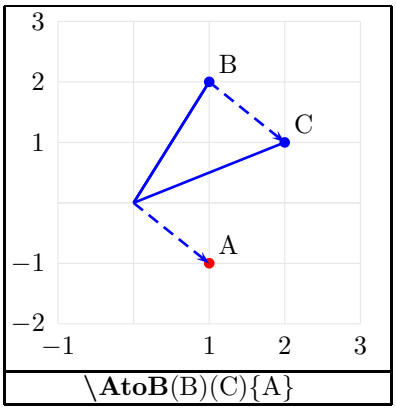
\psRelNodeVar(B)(C)(2;30){A}

10.2.8 Relative position width AplusB




```
\AplusB(B)(C){A}
```

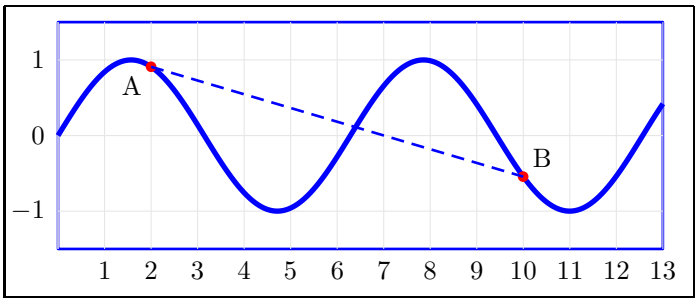
10.2.9 Relative position width AtoB




```
\AtoB(B)(C){A}
```

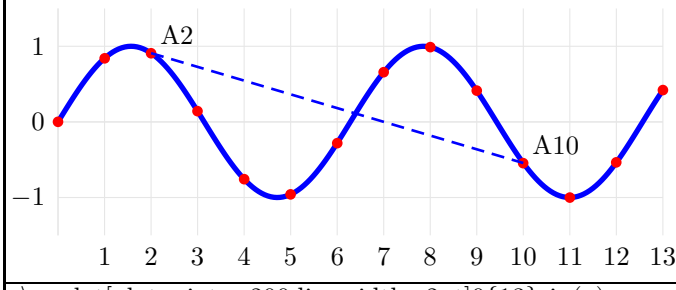
10.3 Node on a curve

10.3.1 Node on a curve with fnpnode



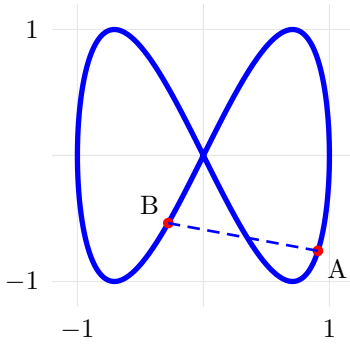

```
\psplot[plotpoints=200,linewidth=2pt]0{13}sin(x)
\fnpnode{2}{sin(x)}{A}
\fnpnode{10}{sin(x)}{B}
\psline[linestyle=dashed] (A) (B)
```

10.3.2 Nodes on a curve with fnpnodes



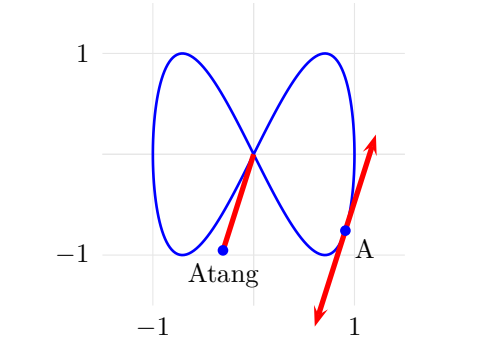

```
\psplot[plotpoints=200,linewidth=2pt]0{13}sin(x)
\fnpnodes[plotpoints=14]{0}{13}{sin(x)}{A}
\psline[linestyle=dashed] (A2) (A10)
```

10.3.3 Node on a parametric curve with curvepnode

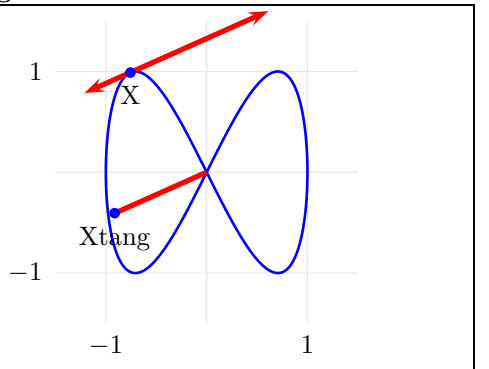



```
\parametricplot[plotpoints=200]{0}{6.28}{sin(t)|sin(2*t)}
\curvepnode{2}{sin(t)|sin(2*t)}{A}
\curvepnode{6}{sin(t)|sin(2*t)}{B}
\psline[linestyle=dashed] (A) (B)
```

Création automatique d'un nœud pour la tangente :



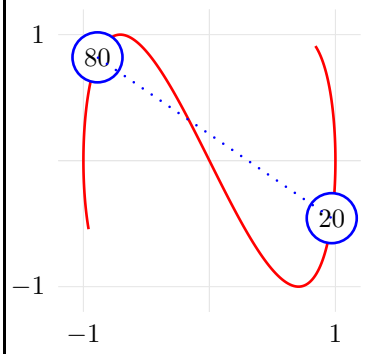

```
\curvepnode{2}{sin(t)|sin(2*t)}{A}
\psxline{<->}(X){-(Atang)}{(Atang)}
```

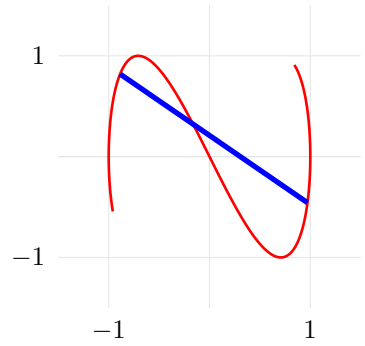



```
\curvepnode{4}{sin(t)|sin(2*t)}{X }
\psxline{<->}(A){-0.5(Xtang)}{1.5(Xtang)}
```

10.3.4 Nodes on a parametric curve with curvepnodes

\curvepnodes[plotpoints=100]{1}{5}{sin(t)|sin(2*t)}{A}



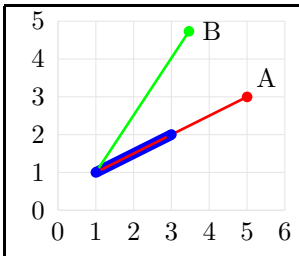


\cnodeput(A20){A}{20}
\cnodeput(A80){B}{80}

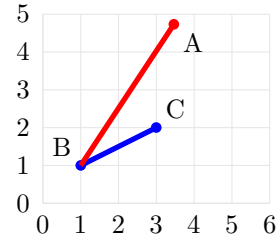
\psline[linewidth=2pt] (A20) (A80)

10.4 Relative line

10.4.1 Relative line width psRelNode

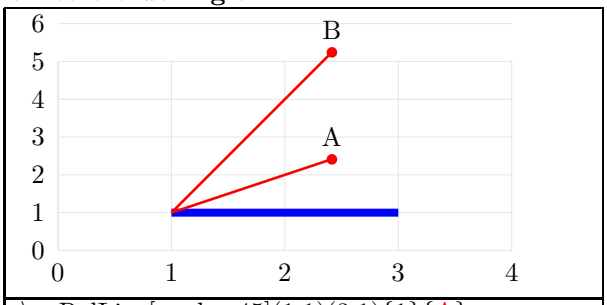


\psRelLine(1,1)(3,2){2}{A}
\psRelLine[angle=30](0,0)(2,1){2}{B}



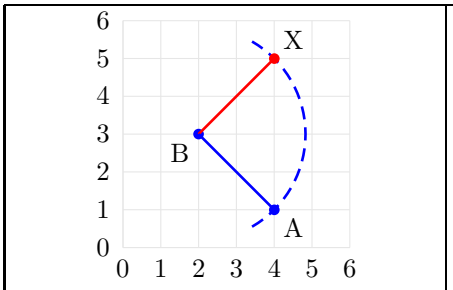
\psRelNode[linecolor=red,angle=30](B)(C){2}{A}

Paramètre trueAngle :



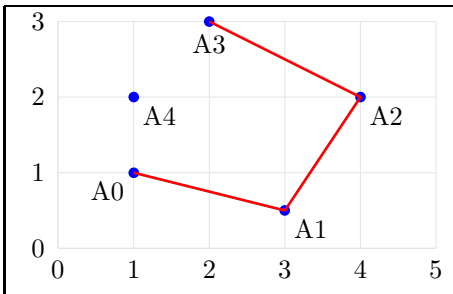
\psRelLine[angle=45](1,1)(3,1){1}{A}
\psRelLine[angle=45,trueAngle](1,1)(3,1){1}{B}

10.4.2 Relative line width psRelLineVar



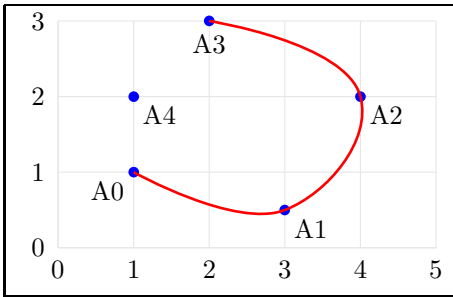
\psRelLineVar(B)(A)(1 ;90){X}	\psRelLineVar(B)(A)(0.5 ;135){Y}

10.4.3 Line from seval points width psnline



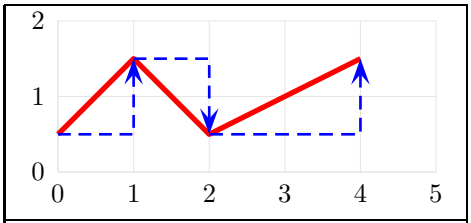
\pnodes{A}(1,1)(3,0.5)(4,2)(2,3)(1,1) \psnline(0,3){A}	\pnodes{A}(1,1)(3,0.5)(4,2)(2,3)(1,1) \psnline(2,2){A}

10.4.4 Curve from seval points width psncurve



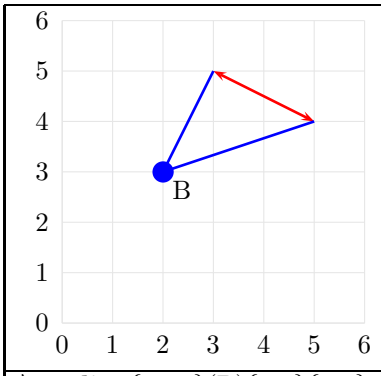
\pnodes{A}(1,1)(3,0.5)(4,2)(2,3)(1,1) \psncurve(0,3){A}	\pnodes{A}(1,1)(3,0.5)(4,2)(2,3)(1,1) \psncurve(2,2){A}

10.4.5 Line by succesive step width psrline

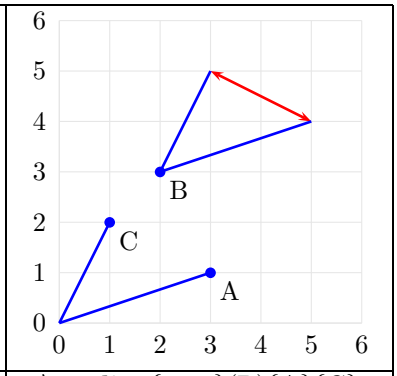


\psrline(0,0.5)(1,1)(1,-1)(2,1)

10.4.6 Lines relative at a point width psxline



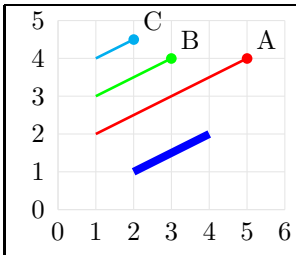
\psxline{<->}(B){1,2}{3,1}



\psxline{<->}(B){A}{C}

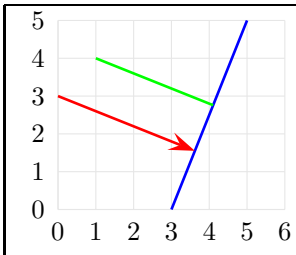
10.5 Parallel lines and their endpoint

Syntax : \psParallelLine(Point 1)(point 2)(point 3){lengh}{end name}



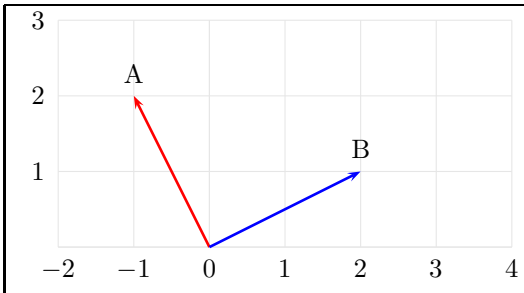
\psParallelLine(2,1)(4,2))(1,2){2}{A}
\psParallelLine(2,1)(4,2)(1,3){1}{B}
\psParallelLine(2,1)(4,2)(1,4){0.5}{C}

10.6 Perpendiculars to a lines

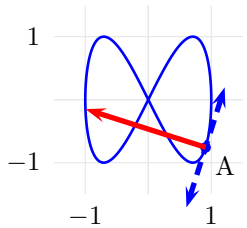


\psline(5,5)(3,0)
\psPline[linecolor=red]{->}(0,3)(5,5)(3,0)
\psPline[linecolor=green](1,4)(5,5)(3,0)

10.7 Vecteur normal



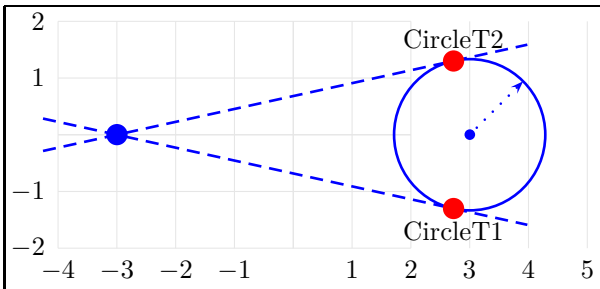
\normalvec(B){A}



\normalvec(Atang){B}
\psxline{->}(A){} {-2(B)}

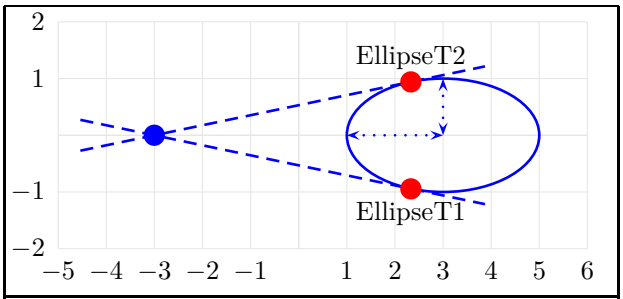
10.8 Tangents

10.8.1 Tangent lines of a circle



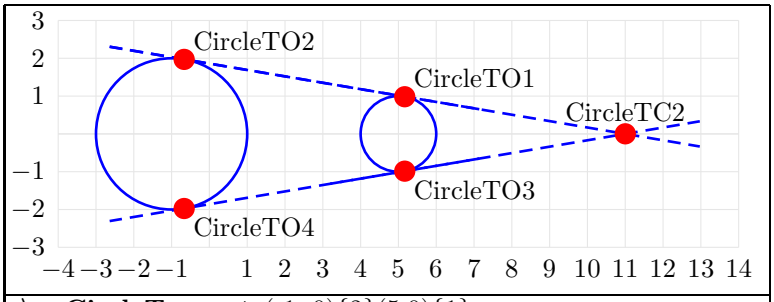
\pscircle(3,0){1}
\psCircleTangents(-3,0)(3,0){1}
\pcline[nodesep=-1cm,linecolor=blue](-3,0)(CircleT1)
\nput{-90}{CircleT1}{CircleT1}

10.8.2 Tangent lines of an ellipse

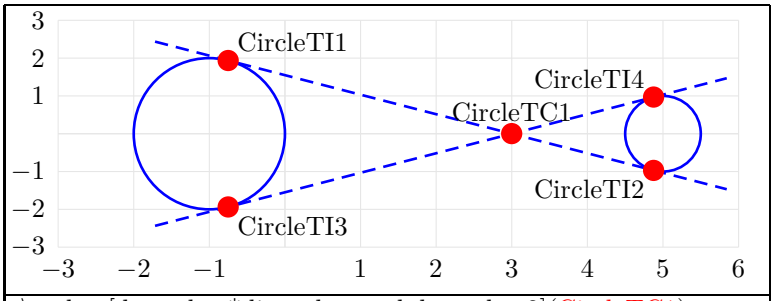


\psellipse(3,0)(2,1)
\psEllipseTangents(3,0)(2,1)(-3,0)
\pcline[nodesep=-1cm](-3,0)(EllipseT1)
\nput{90}{EllipseT1}{EllipseT1}

10.8.3 Tangent lines of circles




```
\psCircleTangents(-1, 0){2}(5,0){1}
\psdots[dotstyle=*,linecolor=red,dotscale=2](CircleTC2)
```

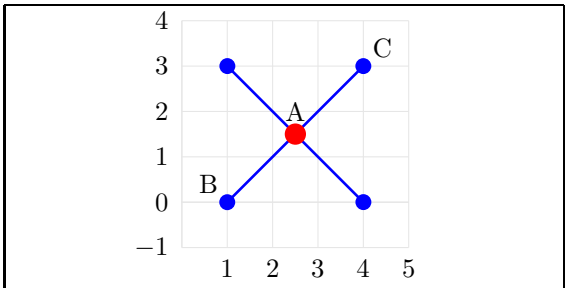



```
\psdots[dotstyle=*,linecolor=red,dotscale=2](CircleTC1)
\nput{90}{CircleTC1}{CircleTC1}
```

10.9 Intersections

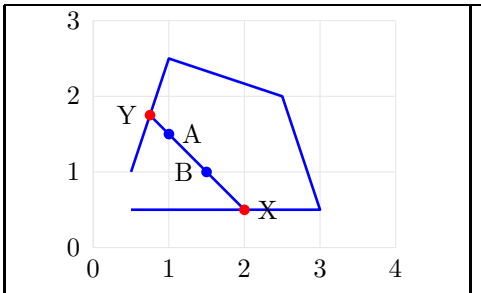
10.9.1 Intersection point of two lines width psIntersectionPoint

Syntax : \psIntersectionPoint(point 1)(point 2)(point 3)(point 4){name}

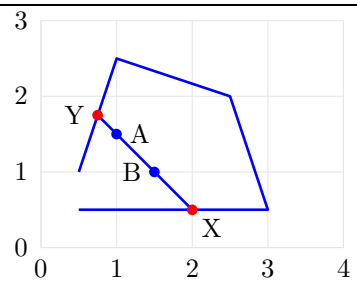



```
\psIntersectionPoint(B)(C)(1,3)(4,0){A}
```

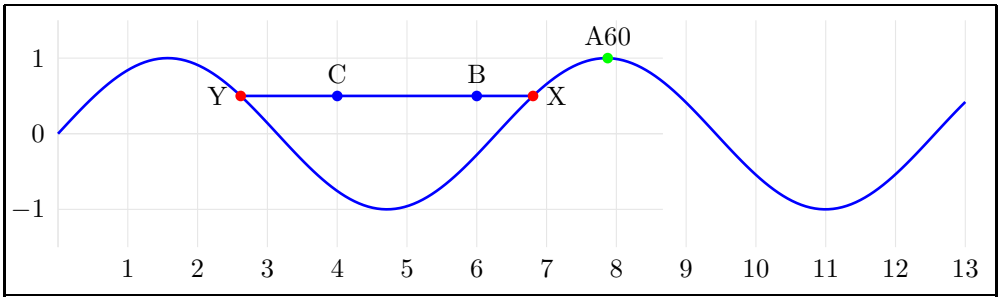
10.9.2 Intersection points with polyIntersections



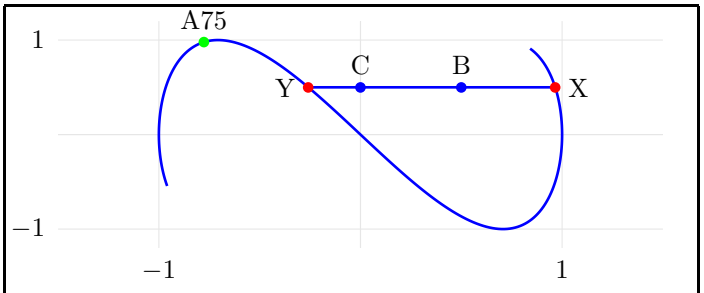
\polyIntersections{X}{Y}(A)(B)
(0.5,0.5)(3,0.5)(2.5,2)(1,2.5)(0.5,1)



\pnodes{P}(0.5,.5)(3,.5)(2.5,2)(1,2.5)(.5,1)
\polyIntersections{X}{Y}(A)(B){P}{4}

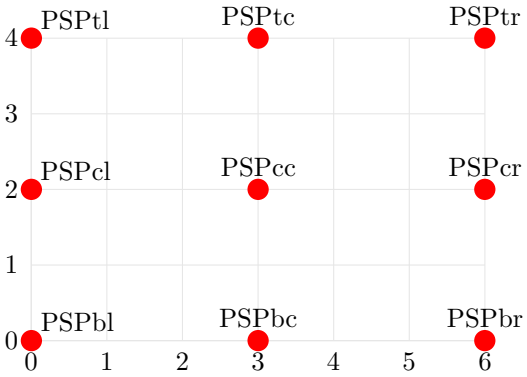


\fnpnodes[plotpoints=100]{0}{13}{sin(x)}{A}
\polyIntersections{X}{Y}(C)(B){A}{60}



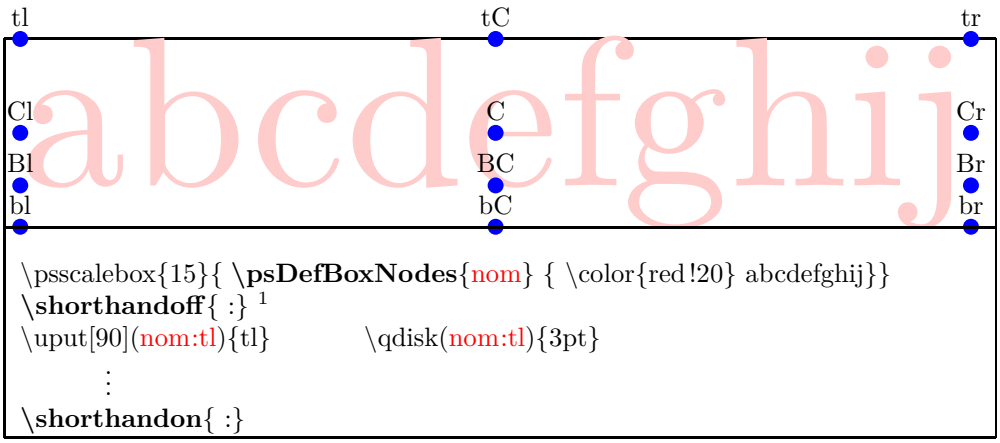
\curvepnodes[plotpoints=100]{1}{5}{sin(t)|sin(2*t)}{A}
\polyIntersections{X}{Y}(C)(B){A}{75}

10.10 The 9 positions with \psDefPSPNodes




```
\beginpspicture(6,4)
\psDefPSPNodes
\psdots(PSPbl)
\uput[45](PSPbl){PSPbl}
```

10.11 Nodes on text with \psDefBoxNodes

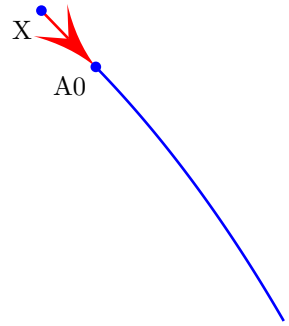



```
\psscalebox{15}{ \psDefBoxNodes{nom} { \color{red!20} abcdefghij}}
\shorthandoff{ :} [1]
\uput[90](nom:tl){tl}          \qdisk(nom:tl){3pt}
        ⋮
\shorthandon{ :}
```

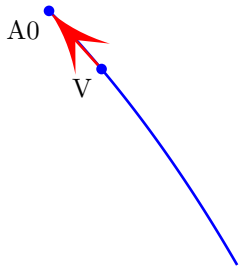
1. désactivation et ré-activation de « : »conflit entre ce module et Babel en français

10.12 ArrowNotch

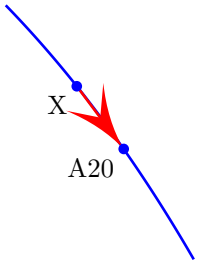
\curvepnodes[plotpoints=100]{1}{1.1}{sin(t)|sin(2*t)}{A}



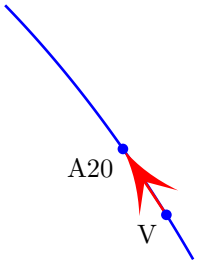
ArrowNotch[arrowscale=10]{A}{0}{>}{X}
\psline[arrowscale=5]{-D>}(X)(A0)



ArrowNotch[arrowscale=10]{A}{0}{<}{V}
\psline[arrowscale=5]{-D>}(V)(A0)



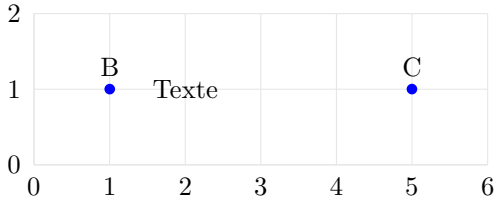
ArrowNotch[arrowscale=10]{A}{0}{>}{X}
\psline[arrowscale=5]{-D>}(X)(A0)



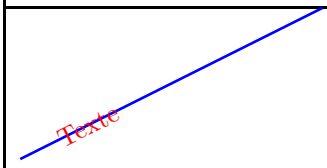
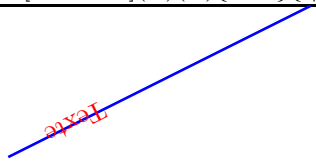
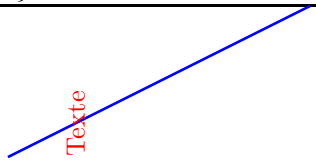
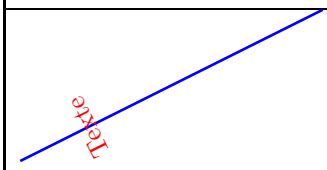
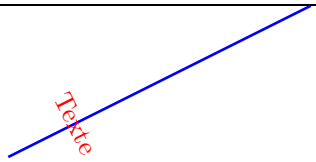
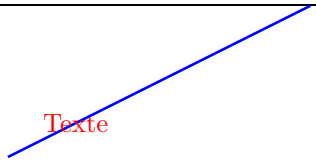
ArrowNotch[arrowscale=10]{A}{0}{<}{V}
\psline[arrowscale=5]{-D>}(V)(A0)

10.13 Placement d'une étiquette à une distance donnée avec nlput

10.14 nlput

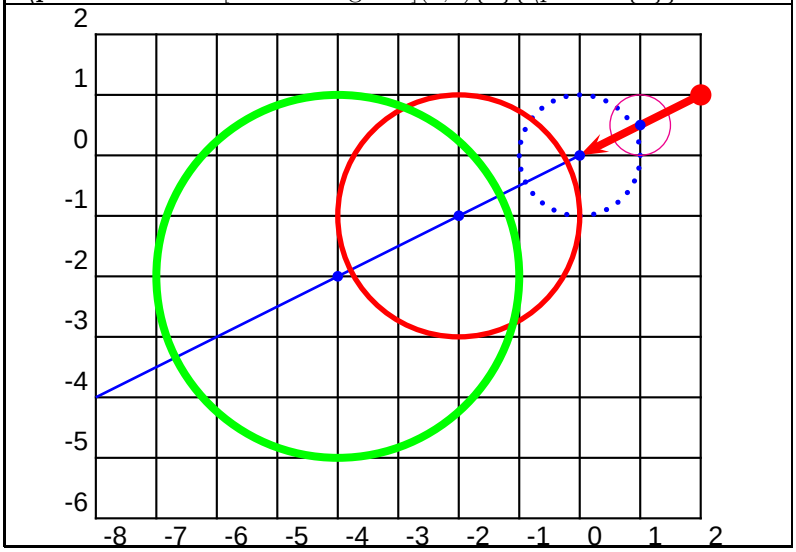


nlput(B)(C){1cm}{Texte}

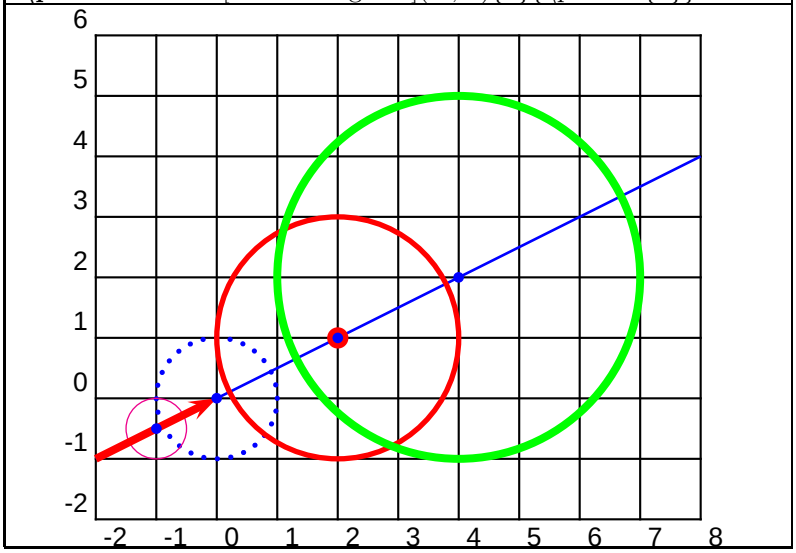
\nlput[nrot=:U](B)(C){1cm}{\red Texte}		
		
nrot=:U	nrot=:U	nrot=90
		
nrot=:L	nrot=:R	sans paramètre

11 Homothety

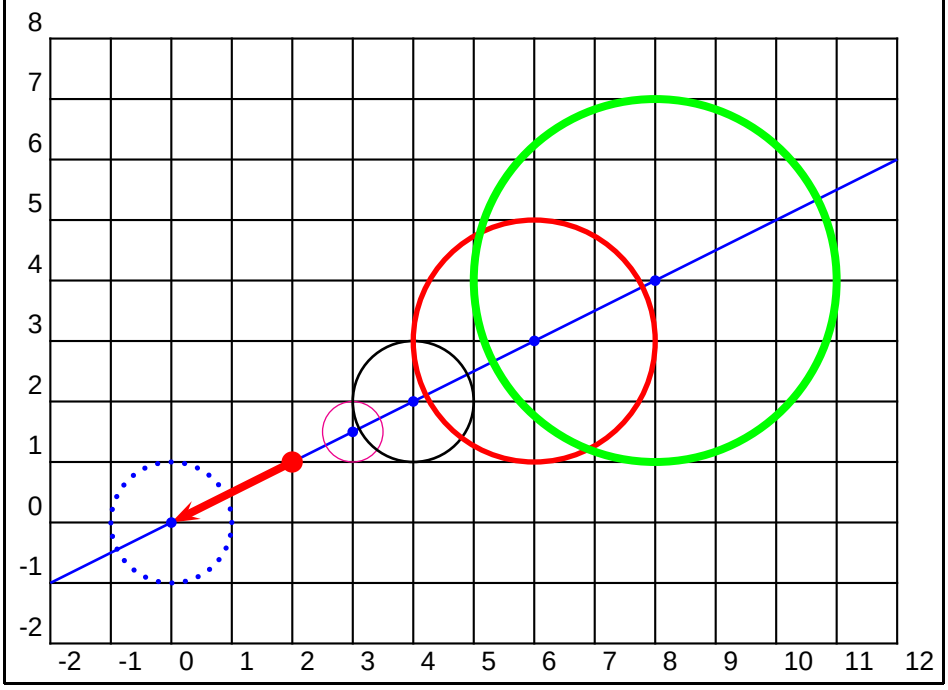
```
\pscircle[linestyle=dotted]{1}
\psHomothetie[linecolor=magenta](2,1){.5}{\pscircle{1}}
\psHomothetie[linecolor=red](2,1){2}{\pscircle{1}}
\psHomothetie[linecolor=green](2,1){3}{\pscircle{1}}
```




```
\pscircle[linestyle=dotted]{1}
\psHomothetie[linecolor=magenta](-2,-1){.5}{\pscircle{1}}
\psHomothetie[linecolor=red](-2,-1){2}{\pscircle{1}}
\psHomothetie[linecolor=green](-2,-1){3}{\pscircle{1}}
```

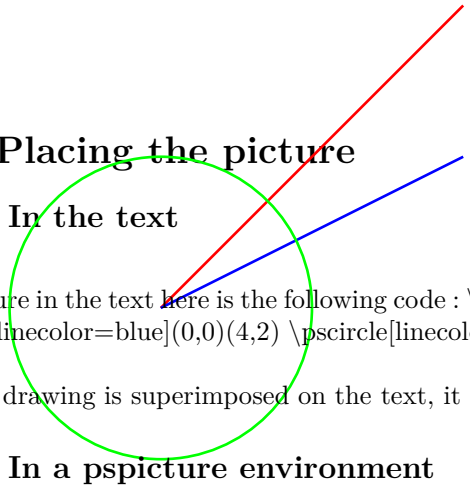


```
\pscircle[linestyle=dotted]{1}
\psHomothetie[linecolor=magenta](2,1){-.5}{\pscircle{1}}
\psHomothetie[linecolor=black](2,1){-1}{\pscircle{1}}
\psHomothetie[linecolor=red](2,1){-2}{\pscircle{1}}
\psHomothetie[linecolor=green](2,1){-3}{\pscircle{1}}
```



12 Placing the picture

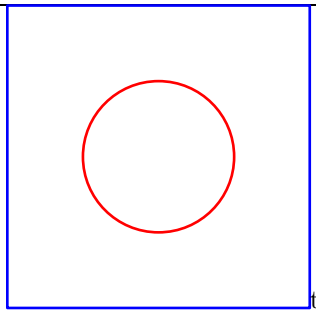
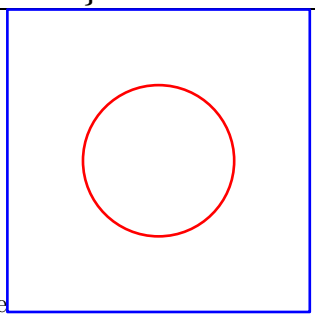
12.1 In the text



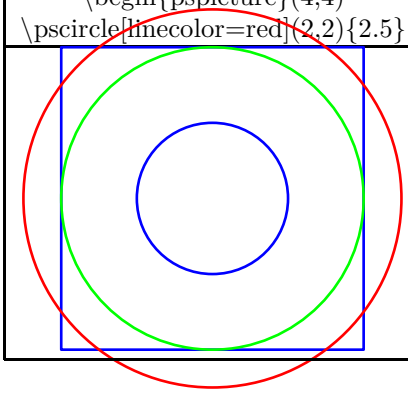
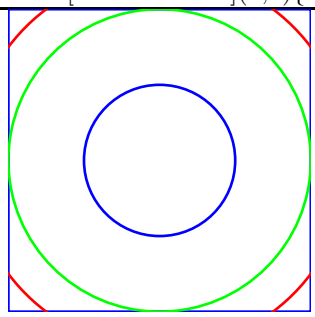
picture in the text here is the following code : \psline[linecolor=red](0,0)(4,4) \psline[linecolor=blue](0,0)(4,2) \pscircle[linecolor=green]{2}

The drawing is superimposed on the text, it has no dimension !

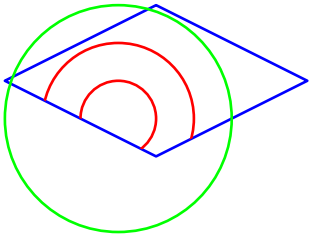
12.2 In a pspicture environment

2 syntaxes	
\pspicture(4,4) \psframe(4,4) \pscircle[linecolor=red](2,2){1cm} **\endpspicture**	**\begin{pspicture}**(4,4) \psframe(4,4) \pscircle[linecolor=red](2,2){1cm} **\end{pspicture}**
text before  text after	text before  text after

12.3 Clipping the picture

\begin{pspicture}(4,4) \pscircle[linecolor=red](2,2){2.5}		\begin{pspicture}*(4,4) \pscircle[linecolor=red](2,2){2.5}
		

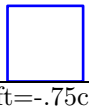
12.4 Partial clipping



```
\begin{pspicture}*(-2,-2)(3,2)
\psclip {\psdiamond(.5,.5)(2,1)}
\pscircle[linecolor=red]{.5}
\pscircle[linecolor=red]{1}
\endpsclip
\pscircle[linecolor=green]{1.5}
\end{pspicture}
```

12.5 Relative to the text line

before \begin{pspicture}[shift=*](1,1) \psframe(1,1) \end{pspicture} after

before  after	before  after	before  after	before  after
By default	shift=*	shift=.5cm	shift=-.75cm

13 Placing objects

13.1 Macro rput

syntax : \rput*[reference point]{rotation}(coordinates){contents}

13.1.1 Role of the asterisk [4]

objet \rput(1,0){objet}	objet \rput*(1,0){objet}

13.1.2 Reference point

Horizontal			
l	left	objet	\rput*[l](1,0){objet}\qdisk(1,0){3pt}
r	right	objet	\rput*[r](1,0){objet}\qdisk(1,0){3pt}
vertical			
t	top	objet	\rput*[t](1,0){objet}\qdisk(1,0){3pt}
b	bottom	objet	\rput* [b](1,0){objet}\qdisk(1,0){3pt}
B	baseline	objet	\rput*[B](1,0){objet}\qdisk(1,0){3pt}
horizontal and vertical			
rt	right and top	objet	\rput*[rt](1,0){objet}\qdisk(1,0){3pt}

13.1.3 Rotation angle of the object

\rput*[t]{45}	\rput*[t]{90}	\rput*[b]{90}	\rput*[B]{90}	\rput*[l]{90}	\rput*[r]{90}
objet	objet	objet	objet	objet	objet

13.1.4 Rotation angle in cardinal points

top and east	top and west	top and north	top and south	left and east	right and east
\rput*[t]{E}	\rput*[t]{W}	\rput*[t]{N}	\rput*[t]{S}	\rput*[l]{W}	\rput*[r]{W}
objet	objet	objet	objet	objet	objet

4. Fillcolor=yellow and Reference point = blue disk

13.2 Macro uput

syntax : **\uput***{spacing}[Reference point]{rotation}(coordinates){content}

13.2.1 Role of the asterisk [5]

objet	objet
\uput(1,0){objet}	**\uput***(1,0){objet}

13.2.2 Reference point : angle

à 45°	objet	\uput*[45](1,0){objet}\qdisk(1,0){3pt}
à 90°	objet	\uput*[90](1,0){objet}\qdisk(1,0){3pt}
à 120°	objet	\uput*[120](1,0){objet}\qdisk(1,0){3pt}

13.2.3 Reference point : letter

\uput*[u]	\uput*[r]	\uput*[d]	\uput*[l]	\uput*[ul]	\uput*[ur]
objet	objet	objet	objet	objet	objet

13.2.4 Rotation angle of the object

\uput*[u]{45}	\uput*[u]{90}	\uput*[d]{90}	\uput*[l]{90}	\uput*[r]{90}	\uput*[ur]{90}
objet	objet	objet	objet	objet	objet

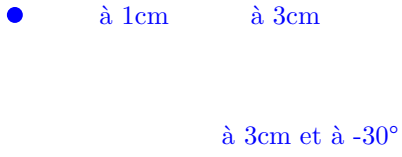
5. Fillcolor=yellow and Reference point = blue disk

13.2.5 Spacing between object and reference point

By default : labelsep= 0.5 pt

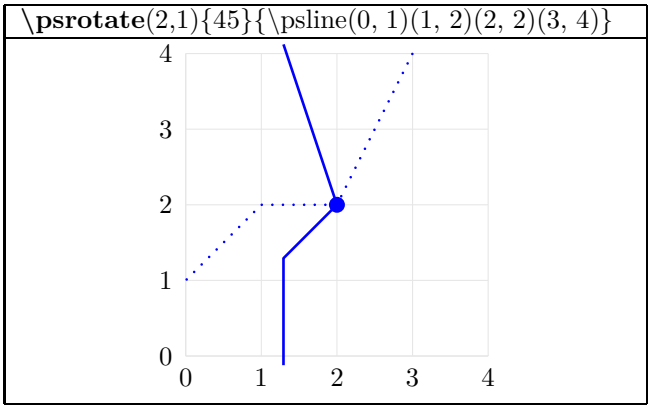
Example :

```
\psset{labelsep=1cm }                    % new default spacing
\uput(1,0){ à 1cm }                      % use of the new default spacing
\uput {3cm}(1,0){à 3cm}                  % spacing = 3cm
\uput{3cm}[-30](1,0){à 3cm et à -30°}    % spacing = 3cm angle= -30°
\qdisk(1,0){3pt}                         %Reference point
```



13.3 Macro psrotate

\psrotate(2,1){45}{\psline(0, 1)(1, 2)(2, 2)(3, 4)}



14 Creating color

Utilisation of the package **xcolor** (automatically loaded with the package pstricks)

14.1 Macro newgray

syntax : **\newgray**{color}{pourcentage}

\newgray{G00}{0} \psframe[fillcolor=G00](1,1)					
{0}	{.2}	{.4}	{.6}	{.8}	{1}
					

14.2 Macro newrgbcolor

syntax : **\newrgbcolor**{color}{%red %green %blue} :

\newrgbcolor{C1}{1 0 0} \psframe[fillcolor=C1](1,1)							
{1 0 0}	{0 1 0}	{0 0 1}	{0 0 .5}	{.5 .5 0}	{0 .5 .5}	{.2 .5 .8}	{.8 .5 .8}
							

14.3 Macro newhsbcolor

syntax **\newhsbcolor**{color}{hue saturation brightness}

\newhsbcolor{C1}{0 .5 .5} \psframe[fillcolor=C1](1,1)							
{0 .5 .5}	{.5 .5 .5}	{1 .5 .5}	{.5 0 .5}	{.5 1 .5}	{.5 .5 0}	{.5 .5 .8}	{.5 .5 1}
							

14.4 Macro newcmykcolor

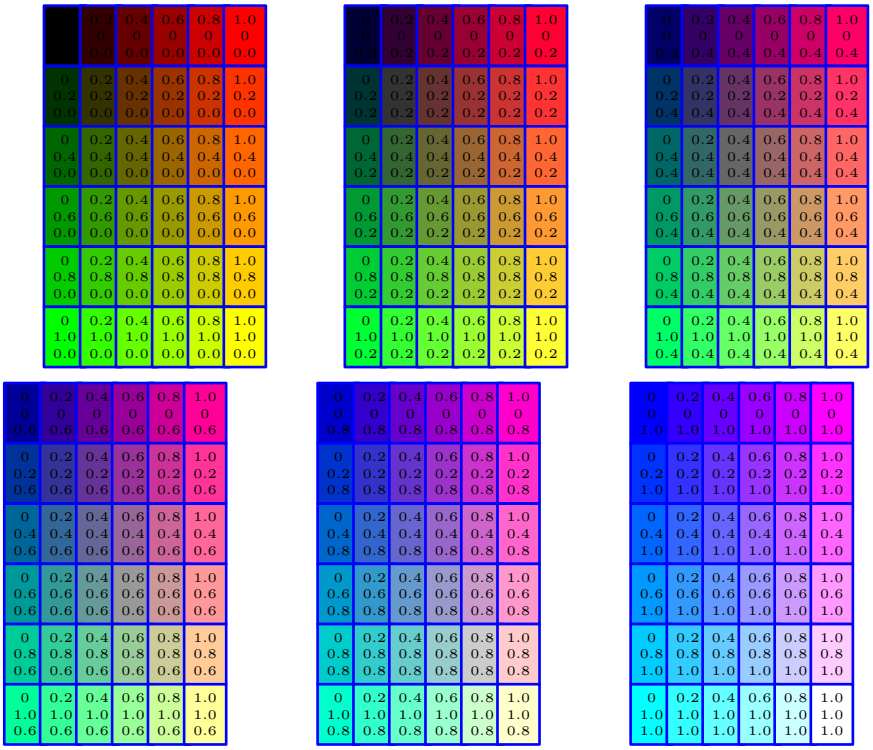
syntax **\newcmykcolor**{color}{cyan magenta yellow black}

\newcmykcolor{C1}{1 0 0 0} \psframe[fillcolor=C1](1,1)							
{1 0 0 0}	{0 1 0 0}	{0 0 1 0}	{.5 .5 0 0}	{0 .5 .5 0}	{.5 .5 0.5 0}	{1 0 0 .2}	{1 0 0 .8}
							

14.5 Tables of colors

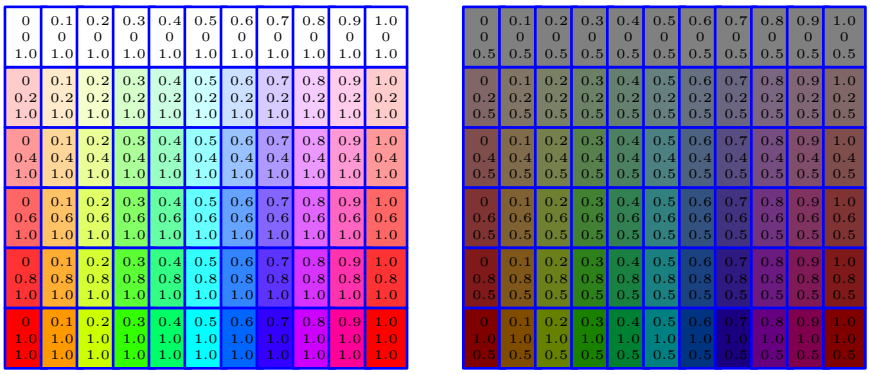
14.5.1 Macro newrgbcolor

red
green
blue

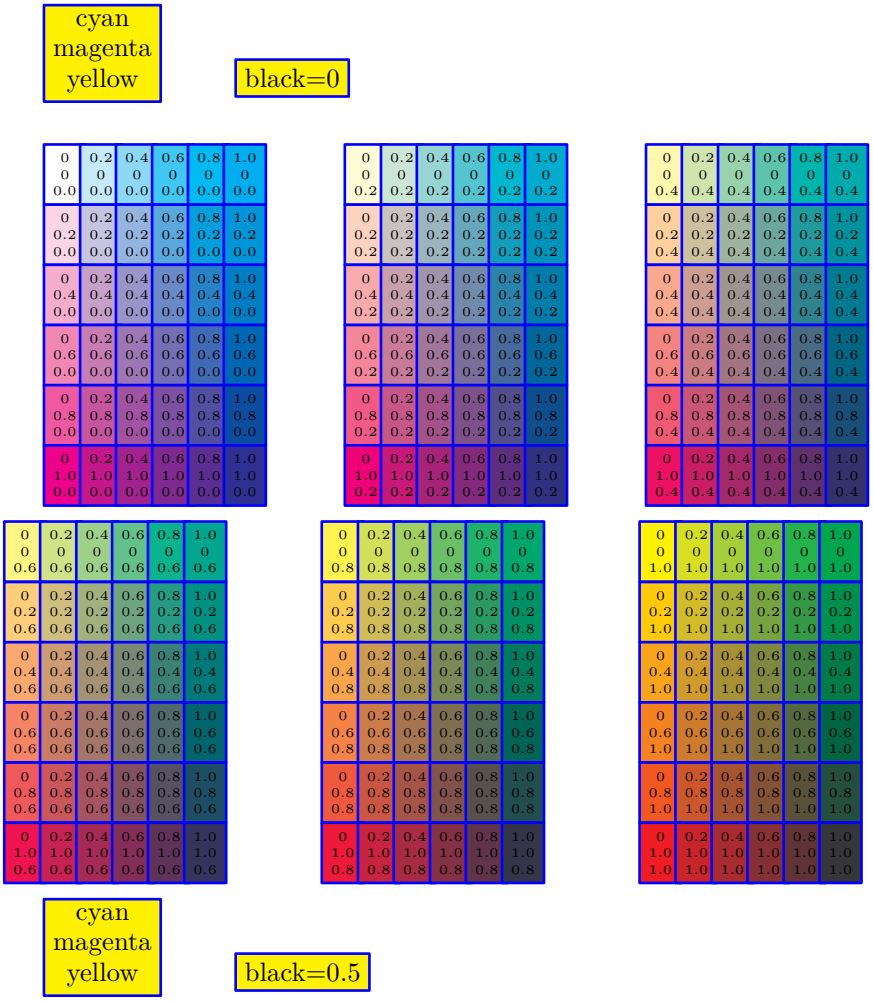


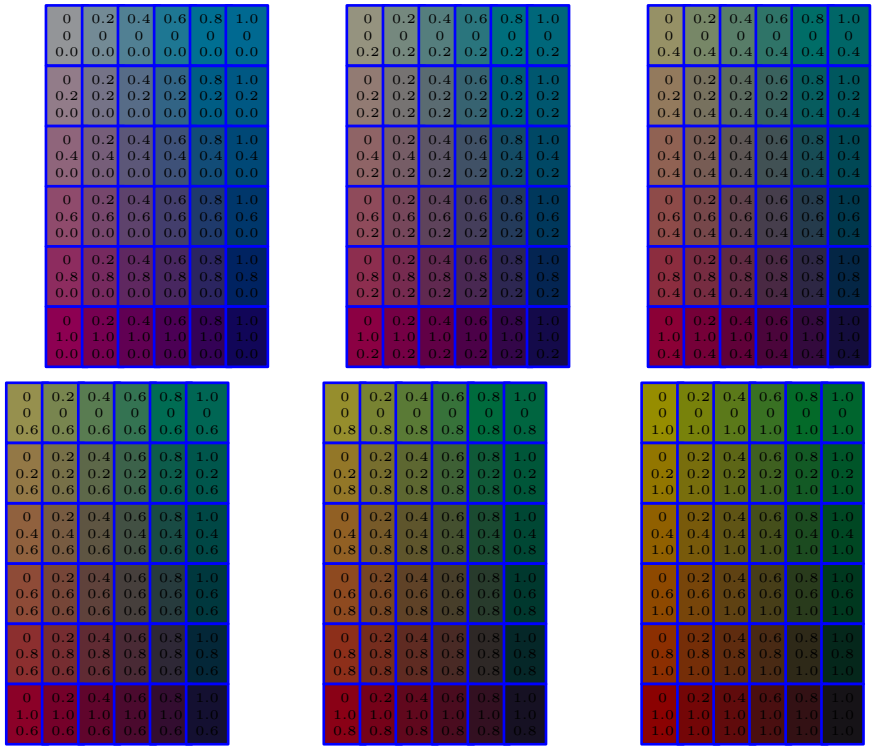
14.6 Macro newhsbcolor

hue
saturation
brightness

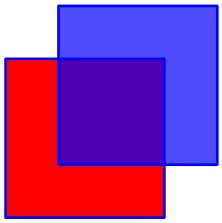
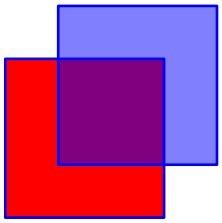
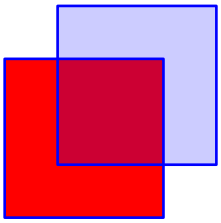
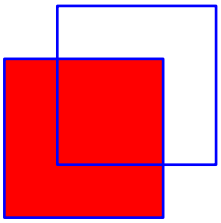


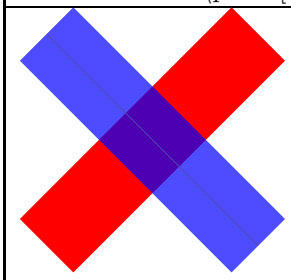
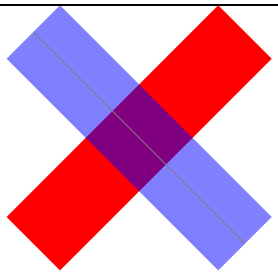
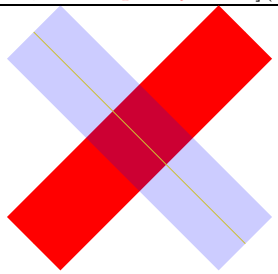
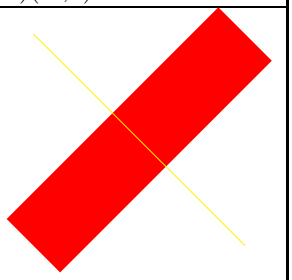
14.7 Macro newcmykcolor





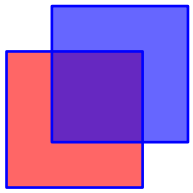
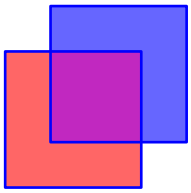
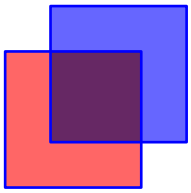
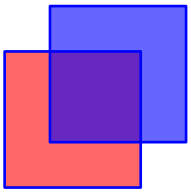
14.8 Opacity

\psframe[fillcolor=blue,opacity=0.7](-1,-1)(2,2)](-2,0)(2,0)			
			
opacity =0.7	opacity =0.5	opacity =0.2	opacity =0

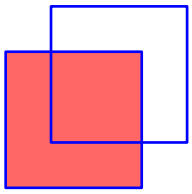
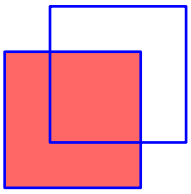
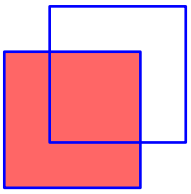
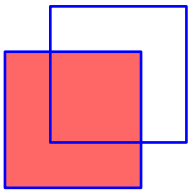
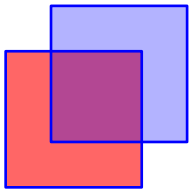
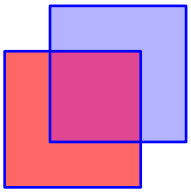
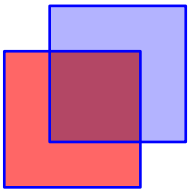
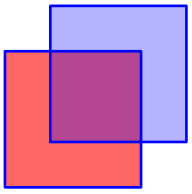
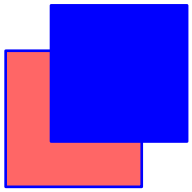
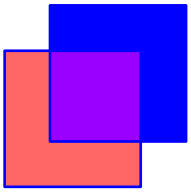
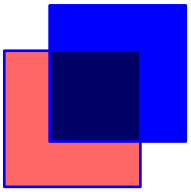
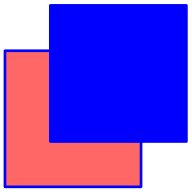
\psline[linewidth=1cm,linecolor=blue,strokeopacity =0.7](2,-2)(-2,2)			
			
strokeopacity =0.7	strokeopacity =0.5	strokeopacity =0.2	strokeopacity =0

14.9 Tranparency

blendmode (By default : blendmode=0)

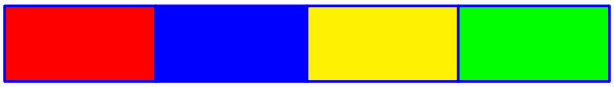
\psset{blendmode=1} (type /Compatible)	\psset{blendmode=2} (type /Screen)	\psset{blendmode=3} (type /Multiply)	\psset{blendmode=0} (type /Normal)
			
\psframe[fillcolor=red,fillstyle=shape](-2,-2)(1,1) \psframe[fillcolor=blue,fillstyle=shape](-1,-1)(2,2)			

shapealpha (By default : shapealpha=0.6)

	\psset{blendmode=1}	\psset{blendmode=2}	\psset{blendmode=3}	\psset{blendmode=0}
shapealpha=0				
shapealpha=0.3				
shapealpha=1				
\psframe[fillcolor=blue,fillstyle=shape,shapealpha=1](-1,-1)(2,2)				

14.10 Monochrome,Grayscale & resetColor

\pssetMonochrome
\psframe[fillstyle=solid,fillcolor=red](2,1)
\psframe[fillstyle=solid,fillcolor=blue](2,0)(4,1)
\psframe[fillstyle=solid,fillcolor=yellow](4,0)(6,1)
\psframe[fillstyle=solid,fillcolor=green](6,0)(8,1)

\pssetMonochrome	
\pssetGrayscale	
\psresetColor	

\pssetMonochrome
\psframe[fillstyle=solid,fillcolor=blue!20](2,1)
\psframe[fillstyle=solid,fillcolor=blue!40](2,0)(4,1)
\psframe[fillstyle=solid,fillcolor=blue!60](4,0)(6,1)
\psframe[fillstyle=solid,fillcolor=blue!80](6,0)(8,1)

\pssetMonochrome	
\pssetGrayscale	
\psresetColor	

15 Own commands

Warning : the creation of the command must be placed before \begin{document} !

syntax :**\newcommand**{\name}[number of variables]{Description}

Example : command with one variable :

Creation

```
\newcommand
{\maboite}[1]{                          % command named « maboite »with one variable
\begin{center}                          % centering the box
\psframebox[fillcolor=yellow,fillstyle=solid]{  % a yellow text box
\parbox{ .5\linewidth }                 % use of \parbox to set the width of the box
{\centering                             % centering the text in the box
#1} }\end{center}                       % #1 will be replaced by the variable
}
```

Utilisation : \maboite{contenu}

contenu

Example : command without variable :

creation

```
\newcommand{\DFR}\psset{unit=.25cm,fillstyle=solid,linewidth=0pt}\begin{pspicture*}(3,1.5)
\psframe[fillcolor=blue](1,1.5) \psframe[fillcolor=white](1,0)(2,1.5)\psframe[fillcolor=red](2,0)(3,1.5)
\end{pspicture*}
```

Utilisation : \DFR 

16 Own styles

syntax : **\newpsstyle**{name}{parameters}

Example :

Definition of the new style :

\newpsstyle{mafleche}{arrowsize=4pt 6,arrowlength=2,doubleline=true,linewidth=1pt}

Using the new style : \psline[style=mafleche]{->}(0,0)(3,0) 

Adding or changing a parameter style [14]

\addtopsstyle{mafleche}{linecolor=red} 

\addtopsstyle{mafleche}{linestyle=dashed} 

17 Own objects

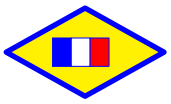
syntaxe : **\newpsobject**{name}{object}{paramètes} :

Example :
\newpsobject{maboite}{psframebox}{fillstyle=solid,fillcolor=yellow,linewidth=2pt,linecolor=red}

\maboite{my custom box} my custom box

18 Boxed objects

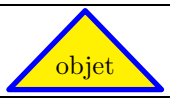
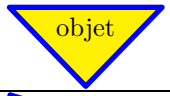
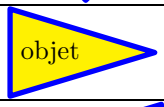
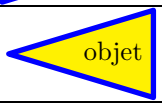
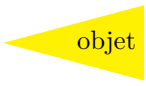
\psframebox*{objet}		
	without asterisk	**with asterisk**
\psframebox*	objet	objet
\psdblframebox*	objet	objet
\psshadowbox*	objet	objet
\pscirclebox*	objet	objet
\psovalbox*	objet	objet
\psdiabox*	objet	objet
\pstribox*	objet	objet

Example : \psdiabox{\DFR} 

18.1 Options

\psframebox framesep=.5cm]{framesep=.5cm}		
By default	framesep=0cm	framesep=.5cm
By default : framesep=3pt	framesep=0cm	framesep=.5cm

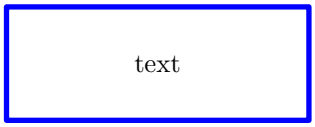
boxsep By default : true (Apply only to \psframebox, \pscirclebox and \psovalbox)				
text before	boxsep=true	text between	boxsep=false	text after

Option trimode only for \pstribox		
	without asterisk	**with asterisk**
\pstribox*[trimode=U]		
\pstribox*[trimode=D]		
\pstribox*[trimode=R]		
\pstribox*[trimode=L]		

\psframebox{\parbox[l]{3cm}{use of **\parbox** to limit the width of the framebox}}
use of **\parbox** to limit the width of the framebox

19 Framed objects

19.1 Text in a frame

	
\psTextFrame(0,0)(4,2){text}	\psTextFrame*[linecolor=yellow](0,0)(4,2){text}

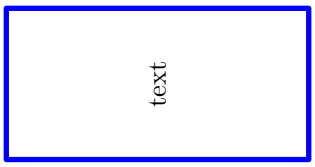
19.1.1 Problem : text too long for the frame

\psTextFrame(0,0)(4,1){Problem : text too long for the frame}
Problem : text too long for the frame

Solutions

text too long for the frame : Problem solved	text too long for the frame : Problem solved
\psTextFrame(0,0)(4,2){ \parbox{3.5cm}{ text too long for the frame : Problem solved }}	\psTextFrame(0,0)(4,2){ \begin{minipage}[c]{3.5cm} text too long for the frame : Problem solved \end{minipage}}

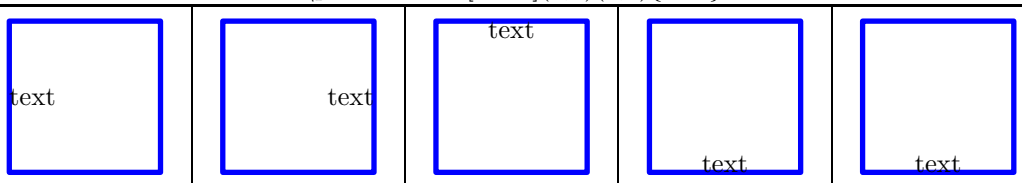
19.1.2 Text rotation in the frame




```
\psTextFrame[rot=90](0,0.5)(4,2){text}
```

19.1.3 Position of the text in the frame

```
\psTextFrame[ref=l](0,0)(2,2){text}
```

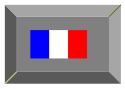


ref=l	ref=r	ref=t	ref=b	ref=B

20 Buttoned objects

Package « **pst-fr3d** »
syntax :**PstFrameBoxThreeD**[paramèters]{Content}

20.1 Without option

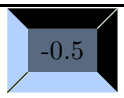
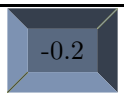
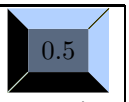
Button	Un ! Deux ! Trois !
\PstFrameBoxThreeD{Button}	\PstFrameBoxThreeD{\shortstack{Un!\\Deux!\\Trois!}}
	$\frac{1}{\sqrt{3}}$
\PstFrameBoxThreeD{\DFR}	\PstFrameBoxThreeD{$\dfrac{1}{\sqrt{3}}$}

20.2 Sizing

doublesep	doublesep=0	doublesep=0.2	doublesep=0.4
framesep	framesep=0	framesep=0.3	framesep=0.5
linewidth	linewidth=0	linewidth=0.1	linewidth=0.2
framearc	framearc=0.3	framearc=0.6	framearc=1

20.3 Aspect

\PstFrameBoxThreeD[FrameBoxThreeDColorHSB =0 0.3 1]{0 0.3 1}				
FrameBoxThreeDColorHSB	0 0.3 1	0.3 0.3 1	0.6 0.3 1	1 0.3 1
FrameBoxThreeDOn=true/false	true	false	true	false
FrameBoxThreeDOpposite=true/false	=false	=true	=false	=true

FrameBoxThreeDBrightnessDistance	 mini		 nul	 défaut	 maxi

21 Canceling objects

	
\psCancel{Objet}	**\psCancel**{$\dfrac{1}{2}$}
	
\psCancel*{Objet}	**\psCancel***[opacity=0.5]{Objet}

\psCancel[cancelType=x]{Objet}		
		
[cancelType=x]	[cancelType=s]	[cancelType=b]

22 Lines and special connections

22.1 Line by hand

\pslineByHand(0,0)(4,0)		
		
By default	varsteptol=5	VarStepEpsilon=.4
	By default : 2	By default : .8

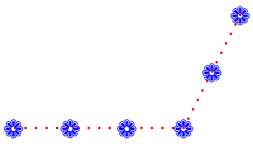
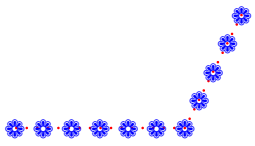
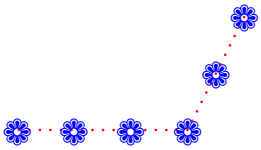
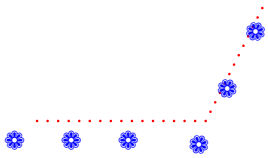
22.2 Symbol on the line

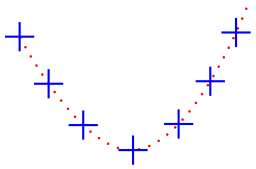
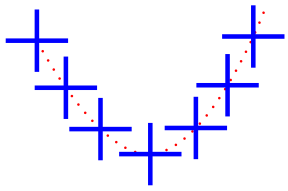
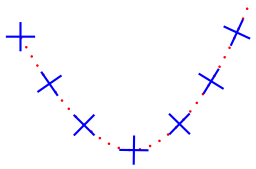
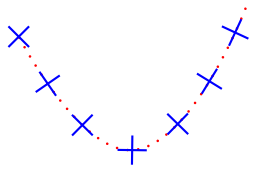
\psline[ArrowInside=->](0.5,0)(5,0)	\psline[ArrowInside=-<](0.5,0)(5,0)
\psline[ArrowInside=-»](0.5,0)(5,0)	\psline[ArrowInside=-«](0.5,0)(5,0)
	
\psline[ArrowInside=-|](0.5,0)(5,0)	\psline[ArrowInside=-|*](0.5,0)(5,0)
	
\psline[ArrowInside=-[](0.5,0)(5,0)	\psline[ArrowInside=-( ](0.5,0)(5,0)
	
\psline[ArrowInside=-o](0.5,0)(5,0)	\psline[ArrowInside=-*](0.5,0)(5,0)
	
\psline[ArrowInside=->|](0.5,0)(5,0)	\psline[ArrowInside=-<|](0.5,0)(5,0)
\psline[ArrowInside=-h](0.5,0)(5,0)	\psline[ArrowInside=-H](0.5,0)(5,0)
	
\psline[ArrowInside=-v](0.5,0)(5,0)	\psline[ArrowInside=-V](0.5,0)(5,0)
\psline[ArrowInside=-f](0.5,0)(5,0)	\psline[ArrowInside=-F](0.5,0)(5,0)
	
\psline[ArrowInside=-t](0.5,0)(5,0)	\psline[ArrowInside=-T](0.5,0)(5,0)

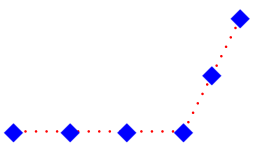
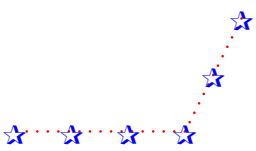
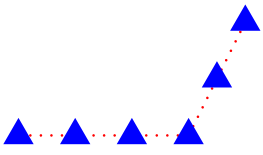
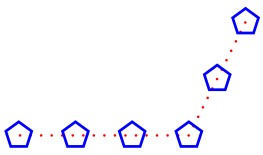
more option [1]	
ArrowInsidePos=.3 (soit à 30%)	ArrowInsidePos=20 (soit à 20 pt)
ArrowInsideNo=5,ArrowInside=->	ArrowInsideNo=3,ArrowInside=-t
	
ArrowInsideOffset=0.1	ArrowInsideOffset=-0.2

22.3 Drawing with symbols

[6]

\psline[linestyle=symbol](-2,0)(2,0)			
			
By default	symbolStep=.5 By default : 20pt	symbolWidth=.5cm By default : 10pt	rotateSymbol=true By default : false

\pscurve[linestyle=symbol,symbolFont=PSTricksDotFont](-2,1)(0,-1)(2,1.5)			
			
By default	symbolWidth =1cm By default : 10pt	rotateSymbol =true By default : false	rotateSymbol=true startAngle=45

symbolFont=Dingbats (By default)		symbolFont=PSTricksDotFont	
			
symbol=u	symbol=120	symbol=u	symbol=120

1. for other parameters see page 19
6. valable seulement pour \psline, \pspolygon,\pscurve \psccurve et \psbezier

22.3.1 Symbols available with the keyboard

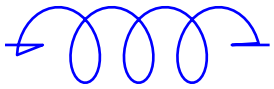
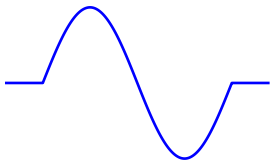
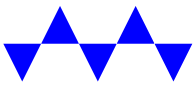
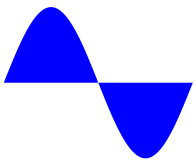
symbolFont=Dingbats (By default)						
A : ✡ ✡	B : ✢ ✢	C : ✣ ✣	D : ✤ ✤	E : ✥ ✥	F : ✦ ✦	G : ✧ ✧
H : ★ ★	I : ☆ ☆	J : ✪ ✪	K : ✫ ✫	L : ✬ ✬	M : ✭ ✭	N : ✮ ✮
O : ✯ ✯	P : ✰ ✰	Q : ✱ ✱	R : ✲ ✲	S : ✳ ✳	T : ✴ ✴	U : ✵ ✵
V : ✶ ✶	W : ✷ ✷	X : ✸ ✸	Y : ✹ ✹	Z : ✺ ✺	1 : ✑ ✑	2 : ✒ ✒
3 : ✓ ✓	4 : ✔ ✔	5 : ✕ ✕	6 : ✖ ✖	7 : ✗ ✗	8 : ✘ ✘	9 : ✙ ✙
a : ❁ ❁	b : ❂ ❂	c : ❃ ❃	d : ❄ ❄	e : ❅ ❅	f : ❆ ❆	g : ❇ ❇
h : ❈ ❈	i : ❉ ❉	j : ❊ ❊	k : ❋ ❋	l : ● ●	m : ❍ ❍	n : ■ ■
o : ❏ ❏	p : ❐ ❐	q : ❑ ❑	r : ❒ ❒	s : ▲ ▲	t : ▼ ▼	u : ◆ ◆
v : ❖ ❖	w : ◗ ◗	x : ❘ ❘	y : ❙ ❙	z : ❚ ❚	+ : ☞ ☞	- : ✍ ✍
* : ☛ ☛	’ : ✇ ✇	> : ✞ ✞	< : ✜ ✜	0 : ✐ ✐	/ : ✏ ✏	. : ✎ ✎

symbolFont=PSTricksDotFont						
A : + +	B :	C : ○ ○	D : ◇ ◇	E : ⊗ ⊗	F : ○ ○	G : ⯃ ⯃
H : ⬡ ⬡	I : ❘ ❘	J : ⊛ ⊛	K : ✱ ✱	L :	M : ⊕ ⊕	N : ⊗ ⊗
O :	P : ⬠ ⬠	Q :	R :	S : □ □	T : △ △	U :
V :	W :	X : × ×	Y :	Z :	1 :	2 :
3 :	4 :	5 :	6 :	7 :	8 :	9 :
a : + +	b : ● ●	c : ○ ○	d : ◇ ◇	e : ⊕ ⊕	f : ○ ○	g : ⯃ ⯃
h : ⬡ ⬡	i : ❘ ❘	j :	k : ✱ ✱	l : ◆ ◆	m : ⊕ ⊕	n : ⊗ ⊗
o :	p : ⬠ ⬠	q : ⬟ ⬟	r : ■ ■	s : □ □	t : △ △	u : ▲ ▲
v :	w :	x : × ×	y :	z :	+ :	- :
* :	’ :	> :	< :	0 :	/ :	. :

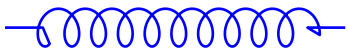
22.4 Coils

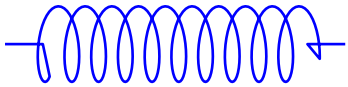
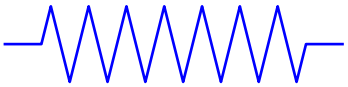
Package **pst-coil**

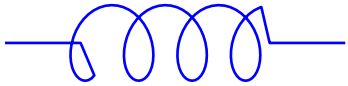
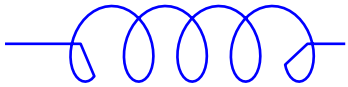
22.4.1 The 3 types of coils

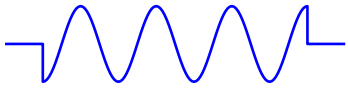
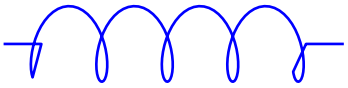
		
pscoil(0.5,0)(4,0)	**pszigzag**(0.5,0)(4,0)	**pssin**(0.5,0)(4,0)
		
pscoil*(0.5,0)(4,0)	**pszigzag***(0.5,0)(4,0)	**pssin***(0.5,0)(4,0)

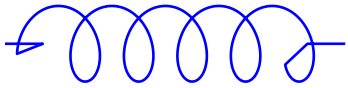
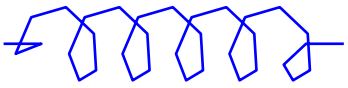
22.4.2 Parameters of coils

	
\pscoil[coilwidth=0.5cm](0.5,0)(5,0)	\pszigzag[coilwidth=0.5cm](0.5,0)(5,0)
By default : 1cm	

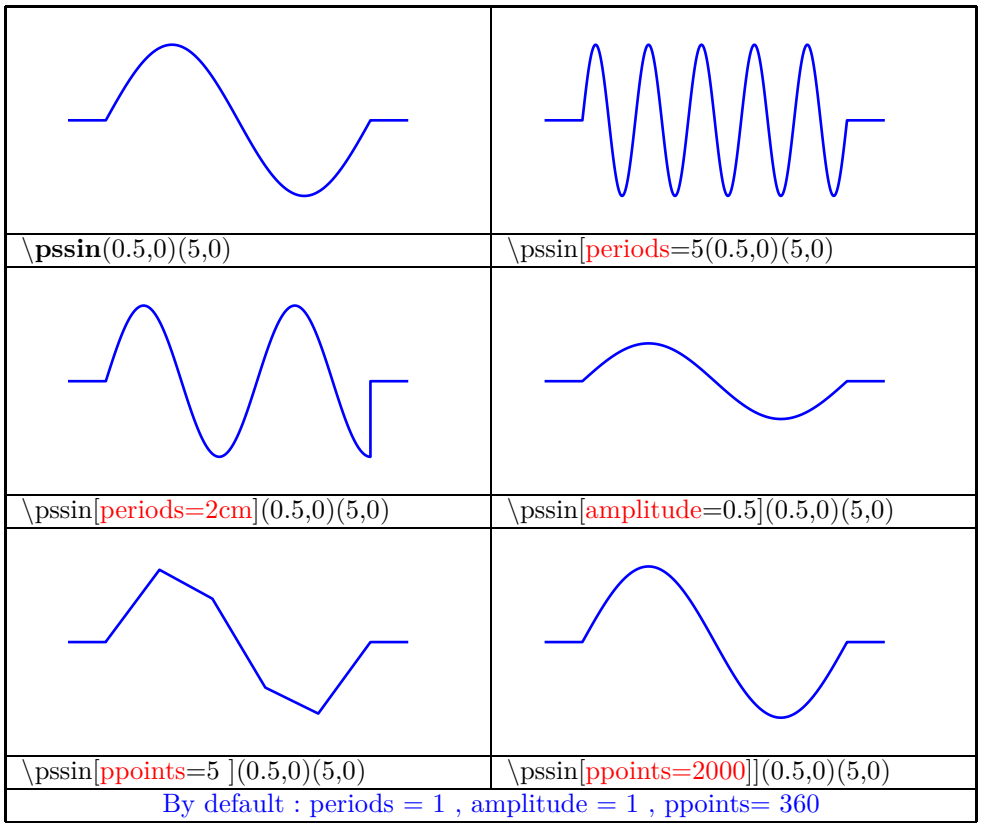
	
\pscoil[coilheight=0.5](0.5,0)(5,0)	\pszigzag[coilheight0.5](0.5,0)(5,0)
By default : 1	

	
\pscoil[coilarm=1](0.5,0)(5,0)	\pszigzag[coilarm=1](0.5,0)(5,0)
	
\pscoil[coilarmA=1](0.5,0)(5,0)	\pszigzag[coilarmB=1](0.5,0)(5,0)
By default : 0.5cm	

	
\pscoil[coilaspect=0](0.5,0)(5,0)	\pscoil[coilaspect=30](0.5,0)(5,0)
By default :45	

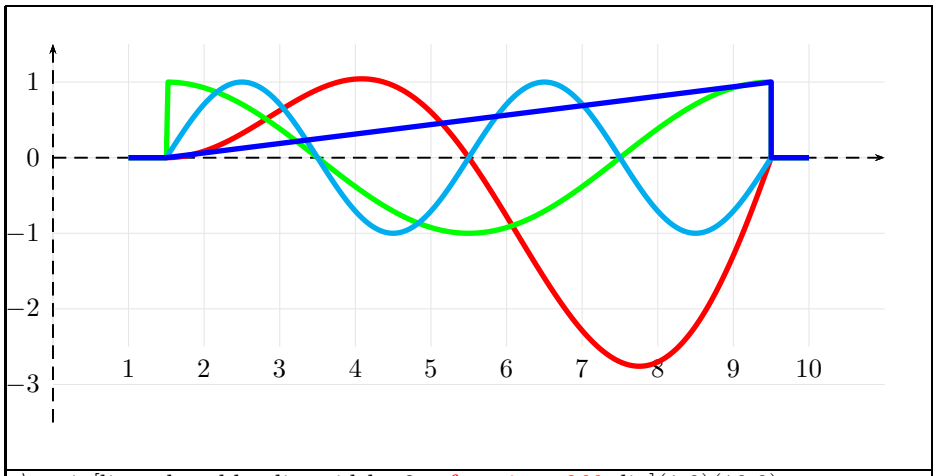
	
\pscoil[coilinc=1](0.5,0)(5,0)	\pscoil[coilinc=30](0.5,0)(5,0)
By default : 10	

	
\pszigzag[bow=1cm](0.5,0)(5,0)	\pszigzag[bow=-1cm](0.5,0)(5,0)
By default : 0	



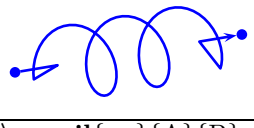
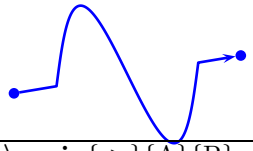
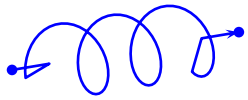
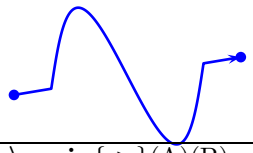
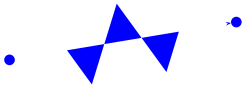
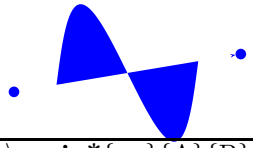
\pssin(0.5,0)(5,0)	\pssin[periods=5(0.5,0)(5,0)
\pssin[periods=2cm](0.5,0)(5,0)	\pssin[amplitude=0.5](0.5,0)(5,0)
\pssin[ppoints=5](0.5,0)(5,0)	\pssin[ppoints=2000]](0.5,0)(5,0)

By default : periods = 1 , amplitude = 1 , ppoints= 360



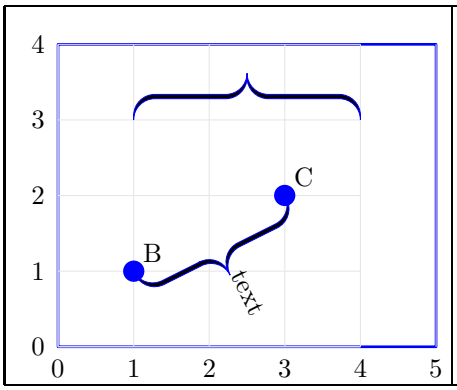

```
\pssin[linecolor=blue,linewidth=2pt,function=360 div](1,0)(10,0)
\pssin[linecolor=green,linewidth=2pt,function=cos](1,0)(10,0)
\pssin[linecolor=cyan,linewidth=2pt,function=2 mul sin](1,0)(10,0)
\pssin[linecolor=red,linewidth=2pt,function=dup sin mul .01 mul](1,0)(10,0)
```

22.4.3 Connecting nodes with coils

\dotnode[dotstyle=*](.5,-.5){A} \dotnode[dotstyle=*](3.5,0){B}		
		
\nccoil{->}{A}{B}	**\nczigzag**{->}{A}{B}	**\ncsin**{->}{A}{B}
		
\pccoil{->}(A)(B)	**\pczigzag** {->}(A)(B)	**\pcsin**{->}(A)(B)
		
\nccoil*{->}{A}{B}	**\nczigzag***{->}{A}{B}	**\ncsin***{->}{A}{B}

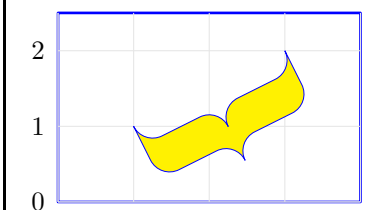
22.5 Braces

22.5.1 Braces in pspicture

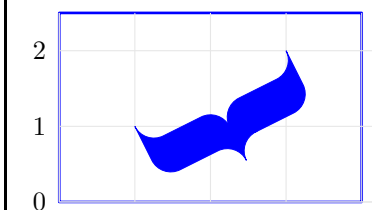



```
\pnode(1,1){B}
\pnode(3,2){C}
\psbrace(B)(C){text}

\psbrace(4,3)(1,3){}
```

Role of the asterisk [1]



\psbrace(1,1)(3,2){}



\psbrace*(1,1)(3,2){}

22.5.2 The brace in the text

the node A is here and the node B is here \psbrace(A)(B){text}
The brace has no dimension !

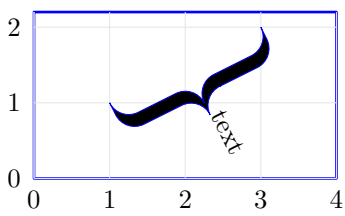
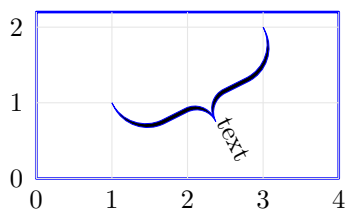
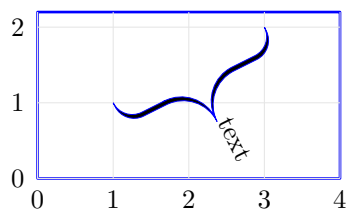
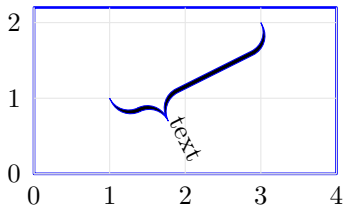
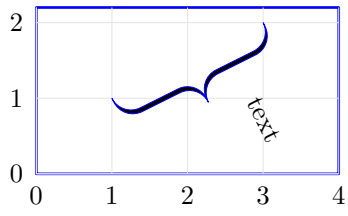
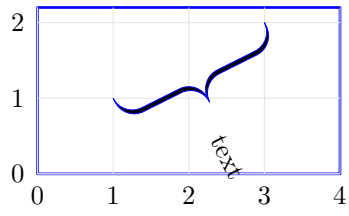
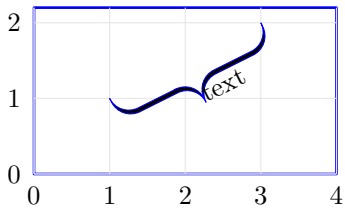
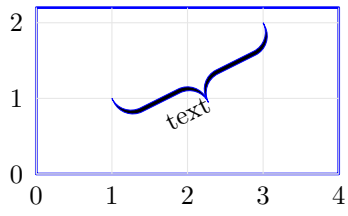
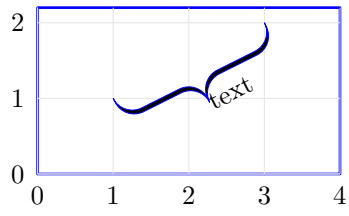
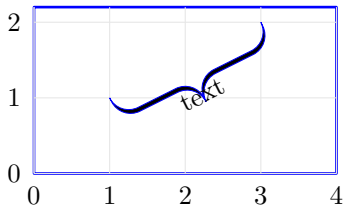
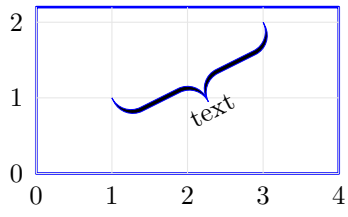
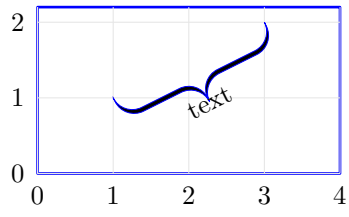
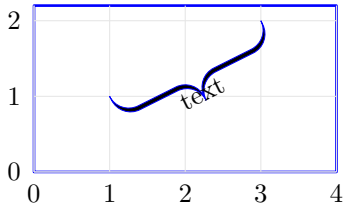
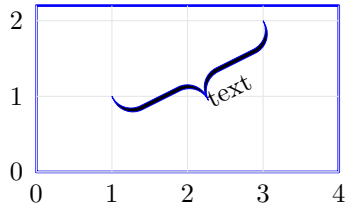
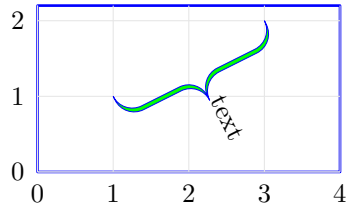
text

here is the node A
\vspace{1cm}

here is the node B \psbrace(A)(B){}

1. braceWidth=.5cm,fillcolor=yellow

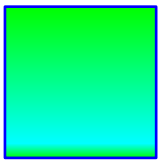
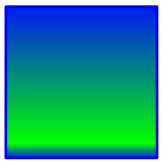
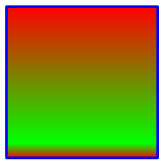
22.5.3 Options

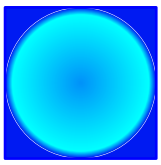
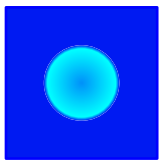
		
braceWidth=5pt By default : \pslinewidth	braceWidthInner=.5cm By default : 10\pslinewidth	braceWidthOuter=.5cm By default : 10\pslinewidth
		
bracePos=.25 Position (%) By default : .5	nodesepA=5pt horizontal offset By default : 0pt	nodesepB=5pt vertical offset By default : 0pt
		
rot=90	rot=90,ref = r	rot=90,ref=l
		
rot=90,ref=b	rot=90,ref=t	rot=90,ref=C
		
rot=90,ref=B	rot=90,ref=lC	fillcolor=green

23 Special fillings

23.1 Color gradient

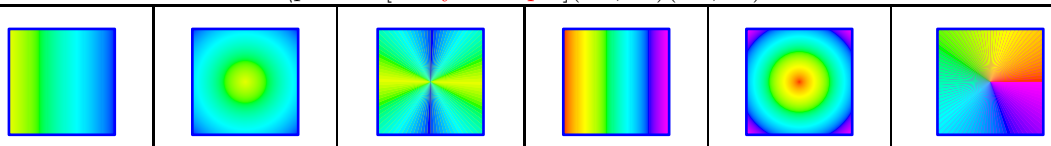
23.1.1 Module pst-grad [1] [11]

\psframe[fillstyle=gradient](0.5,.5)(2.5,2.5)			
			
By default	gradbegin=green	gradend=green	gradbegin=red gradend=green
			
gradlines=5	gradmidpoint=0.7	gradangle=45	gradangle=90
By default : 500	By default : 0.9	By default : 0	

\psframe[fillstyle=gradient,GradientCircle=true](0.5,.5)(2.5,2.5)			
			
	GradientScale=.5	GradientScale=2	GradientPos={(1,1)}

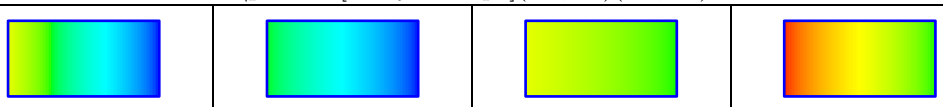
23.1.2 Module pst-slpe [20]

\psframe[fillstyle=slope](0.5,0.5)(2.5,2.5)

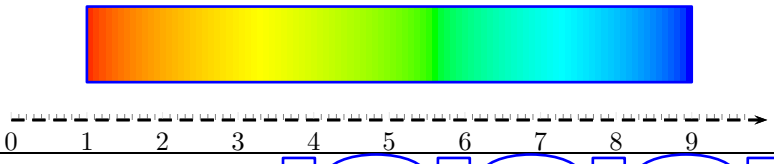


slope [20]	ccslope [20]	radslope [20]	slopes [20]	ccslopes [20]	radslopes [20]

\psframe[fillstyle=slope](0.5,0.5)(2.5,1.5)



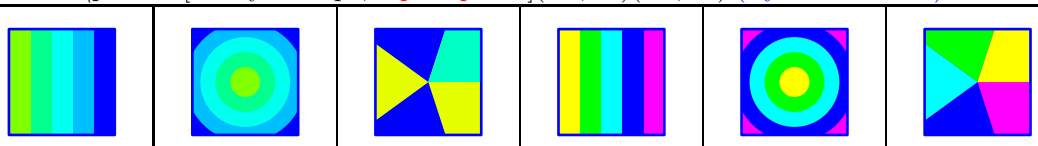
By default	slopebegin=green	slopeend=green	slopebegin=red slopeend=green



\psframe[fillstyle=slopes,slopecolors= 0 1 0 0 4 0 1 0 7 0 0 1 3](1,.5)(9,2.5)

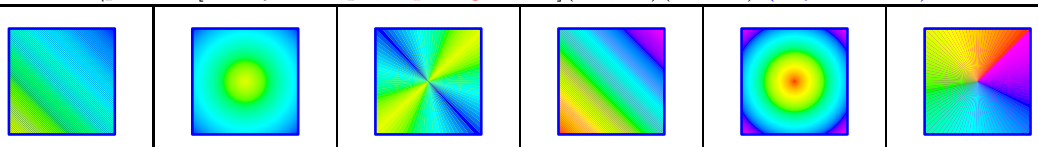
Position | couleur en RGB | nombre de couleurs

\psframe[fillstyle=slope,slopesteps=5](0.3,0.3)(1.7,1.7) (By default : 100)



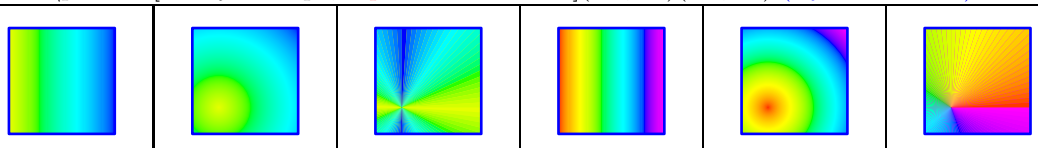
slope	ccslope	radslope	slopes	ccslopes	radslopes

\psframe[fillstyle=slope,slopeangle=45](0.5,0.5)(2.5,2.5) (By default0)

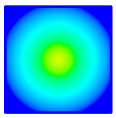
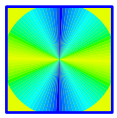
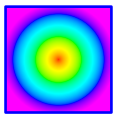


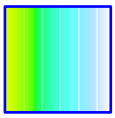
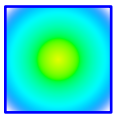
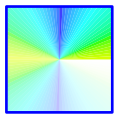
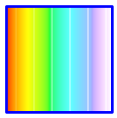
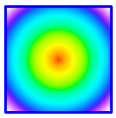
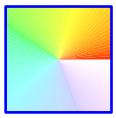
slope	ccslope	radslope	slopes	ccslopes	radslopes

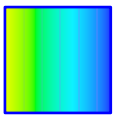
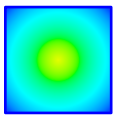
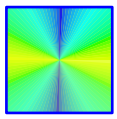
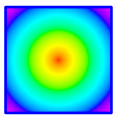
\psframe[fillstyle=slope,slopecenter= .25 .25](0.5,0.5)(2.5,2.5) (By default.5 .5)

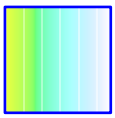
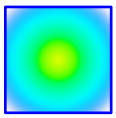
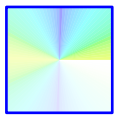
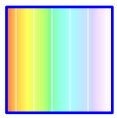
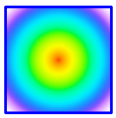


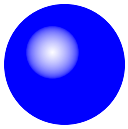
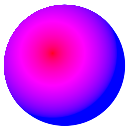
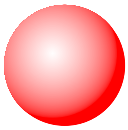
slope	ccslope	radslope	slopes	ccslopes	radslopes

\psframe[fillstyle=slope,sloperadius =.75](0.5,0.5)(2.5,2.5) (By default0.5cm)					
					
slope	ccslope	radslope	slopes	ccslopes	radslopes

\psframe[fading, fillstyle=slope](0.5,0.5)(2.5,2.5)					
					
slope	ccslope	radslope	slopes	ccslopes	radslopes

\psframe[fading, startfading=0.5, fillstyle=slope](0.5,0.5)(2.5,2.5)					
					
slope	ccslope	radslope	slopes	ccslopes	radslopes

\psframe[fading, endfading=0.5, fillstyle=slope](0.5,0.5)(2.5,2.5)					
					
slope	ccslope	radslope	slopes	ccslopes	radslopes

\psBall [option](1,1){blue}{.8}					
					
sans option	sloperadius=10pt	slopebegin=red	slopeend=red	fading	slopesteps=5

23.2 Filling with pattern

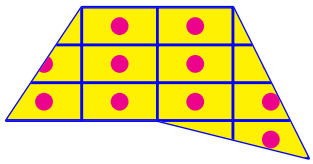
Package **pst-fill**

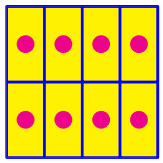
Creating the pattern : 

```
\newcommand{\MonMotif}{
\begin{pspicture}(1,.5)
\psframe[dimen=middle,fillcolor=yellow,fillstyle=solid,linecolor=blue](1,.5)
\pscircle[dimen=middle,fillcolor=magenta,fillstyle=solid,linecolor=magenta](.5,.25){.1}
\end{pspicture} }
```

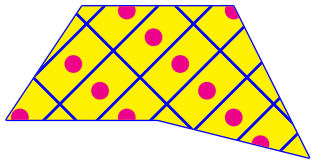
Using the pattern : **\psboxfill**{\MonMotif}

```
\pspolygon[fillstyle=boxfill](0,.5)(1,2)(3,2)(4,0)(2,.5)
```

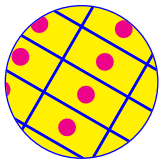




fillangle=90

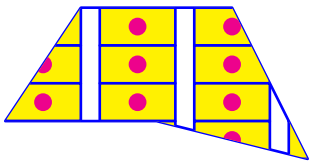


fillangle=45

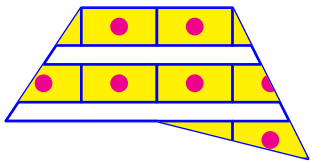


fillangle=-30

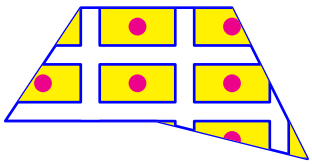
By default : 0



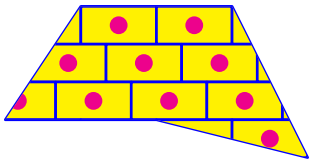
fillsepx=.25cm



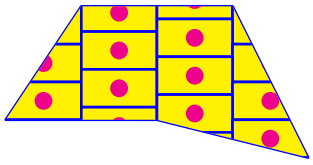
fillsepy=.25cm



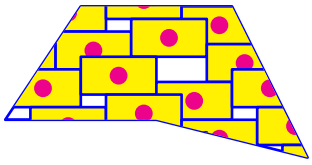
fillsep=.25cm



fillcyclex=3

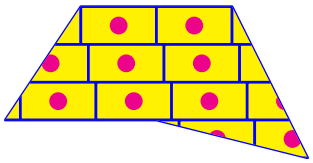
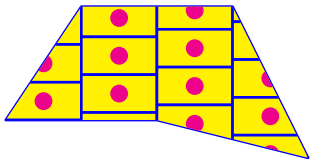
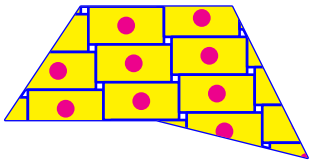


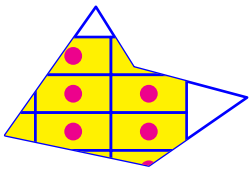
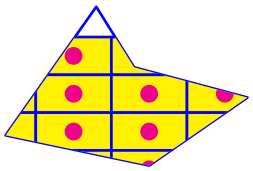
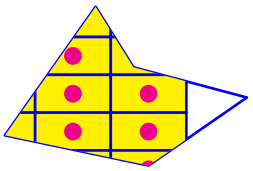
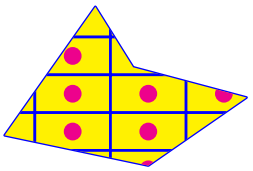
fillcycley=3



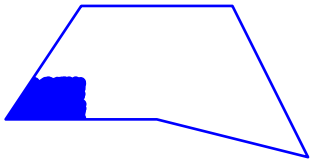
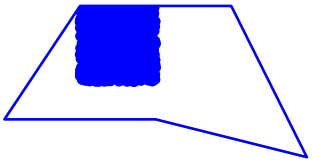
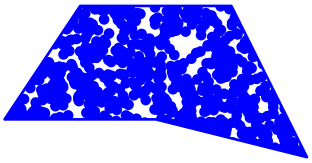
fillcycle=3

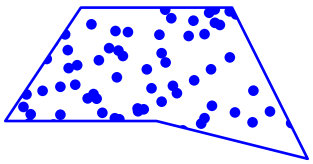
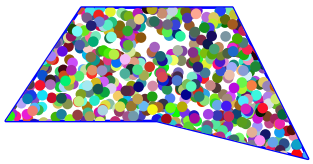
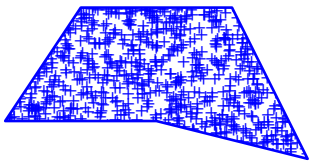
3 corresponds to 1/3, By default : 0

		
fillmovex=.1	fillmovey=.1	fillmove=.1
.1 corresponds to 0,1 cm , By default : 0		

\pspolygon[fillstyle=boxfill](0.6,.7)(1.8,2.4)(2.3,.6)(4,1.2)(2.5,.3)			
			
	fillloopaddx=1	fillloopaddy=1	fillloopadd=1
By default : 0			

23.3 random points filling

\psRandom{\pspolygon(0,.5)(1,2)(3,2)(4,0)(2,.5)}		
		
\psRandom{\pspolygon ...}	\psRandom(1,1)(2,2){...}	\psRandom(0,0)(4,2){...}

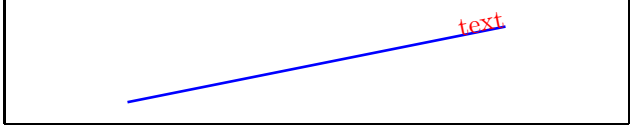
\psRandom[options](0,0)(4,2){\pspolygon(0,.5)(1,2)(3,2)(4,0)(2,.5)}		
		
randomPoints=100	color	dotstyle=+
By default : 1000		

24 Special effects

24.1 pstextpath

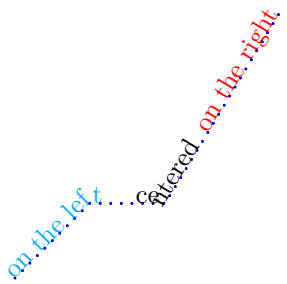
position offset graphic support

```
\pstextpath[r] (0,0){\psline(0, 0)(5, 1)}{\red text}
```

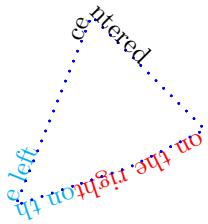


24.1.1 Positioning on different graphic objects

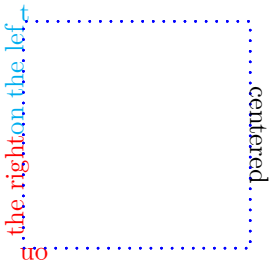
```
\pstextpath[r] (0,0){\psline(0, 0)(1, 1)(2, 1)(3.5, 3.5)}{\red on the right}
\pstextpath[l] (0,0){\psline(0, 0)(1, 1)(2, 1)(3.5, 3.5)}{\cyan on the left}
\pstextpath[c] (0,0){\psline(0, 0)(1, 1)(2, 1)(3.5, 3.5)}{ centered }
```



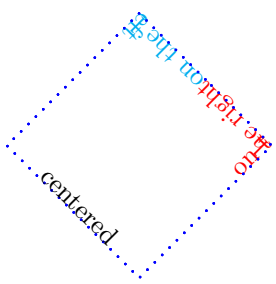
\psline



\pspolygon

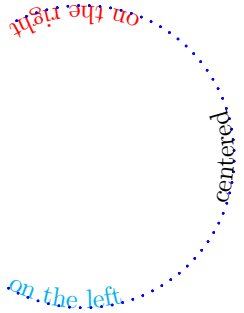


\psframe

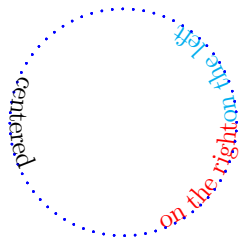
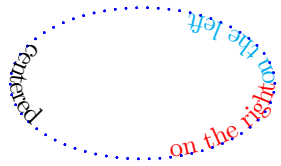
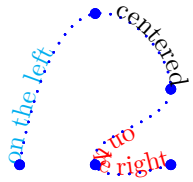
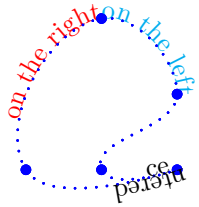
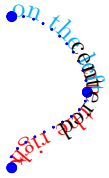
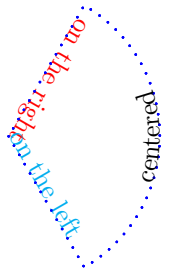
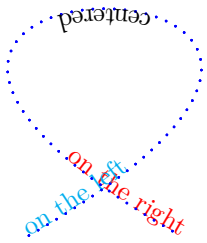
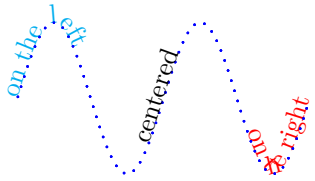


\psdiamond

\pstriangle



\psarc

		
\pscircle	\psellipse	\psellipticarc
		
\pscurve	\psccurve	\psecurve
		
\pswedge	\psbezier	\psplot[algebraic]{0}{12.56}{sin(x)}

24.1.2 Offset

\pstextpath[l](0,.5){\psline(0, 0)(1, 1)}{text}			
			
(0,0.5)	(0,-0.5)	(0.5,0)	(0.5,0.5)
By default : (0,\TPoffset) \TPoffset= -0.7ex.			

24.2 pscharpath

\DeclareFixedFont{\[nom]}{\encodingdefault} {\familydefault}{\seriesdefault}{\shapedefault}{taille}

name encoding : T1 family : Times series : bold shape : normale

DeclareFixedFont{\Font}{T1}{ptm}{b}{n}{2cm}
pscharpath{\Font PSTricks}

PSTricks

24.2.1 Some families

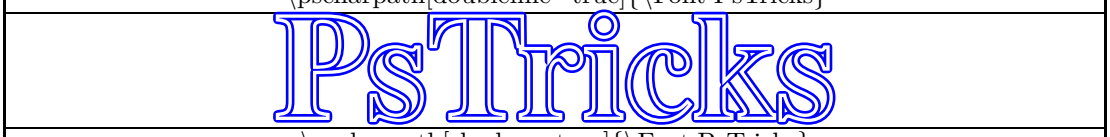
PSTricks	PSTricks
famille : ppl (Palatino)	famille : pag (AvantGarde)
PSTricks	PSTricks
famille : pcr (Courier)	famille : pnc (NewCenturySchoolbook)
PSTricks	PSTricks
famille : psy (Symbol)	famille : pzc (ZapfChancery)
PSTricks	PSTricks
famille : phv (Helvetica)	famille : pzd (ZapfDingbats)

24.2.2 Formatting

\pscharpath[linecolor=lightgray]{\Font PsTricks}

\pscharpath[fillstyle=gradient,gradbegin=red,gradend=cyan,shadow=true]{\Font PsTricks}

\pscharpath[doubleline=true]{\Font PsTricks}



\pscharpath[shadow=true]{\Font PsTricks}

\pscharpath with asterisk

\pscharpath*{\Font PsTricks}

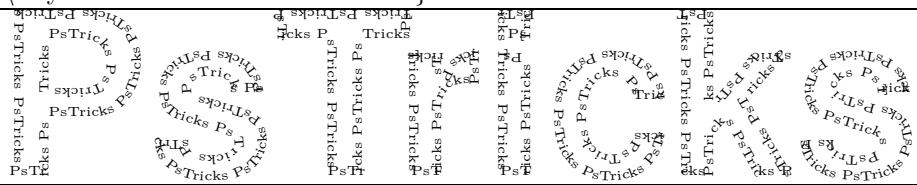
\pscharpath*[linecolor=cyan]{\Font PsTricks}

\pscharpath[doubleline=true,linecolor=magenta]{\Font PsTricks}

24.2.3 Special effects

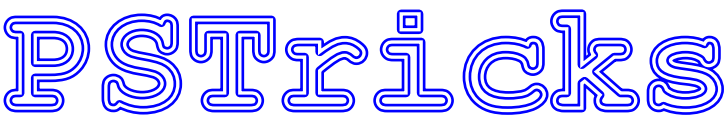
\psboxfill{\tiny pstricks}
\pscharpath[fillstyle=boxfill,fillangle=45] {\Font PsTricks}

```
\DeclareFixedFont{\Font}{T1}{phv}{b}{n}{2cm}
\pstextpath(0,0){\pscharpath*[linestyle=none]{\Font PsTricks}}
{\tiny PsTricks PsTricks PsTricks ...}
```



24.3 pscharclip

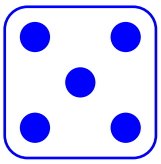
```
\DeclareFixedFont{\Font}{T1}{pcr}{b}{n}{2cm}
\begin{pspicture*}(12,3)
\begin{pscharclip}[doubleline=true]{
\rput(6,1.5){\Font PSTricks}
}
\end{pscharclip}
\end{pspicture*}
```



25 Various objects

25.1 Dices

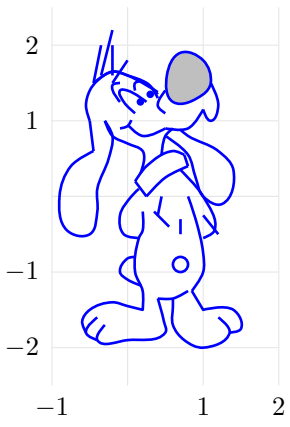
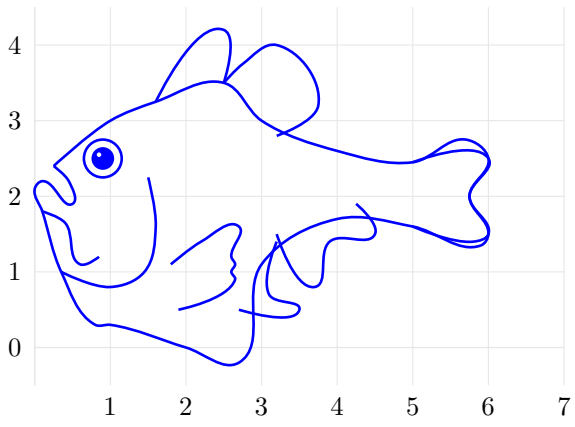
					
\psdice{1}	\psdice{2}	\psdice{3}	\psdice{4}	\psdice{5}	\psdice{6}

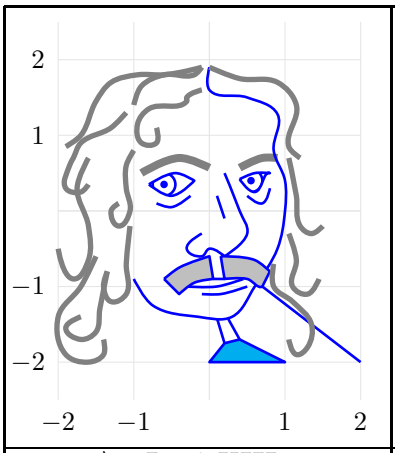

\psdice[unit=2]{5}

25.2 Fun drawing

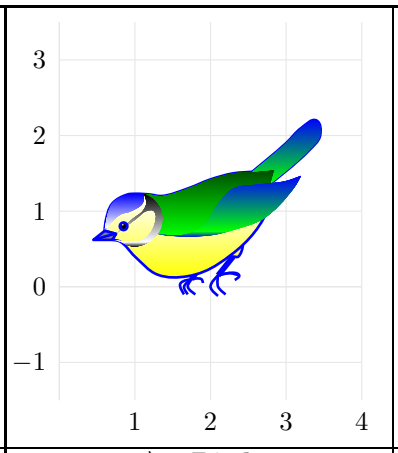
Package « **pst-fun** »

25.2.1 Commandes brutes

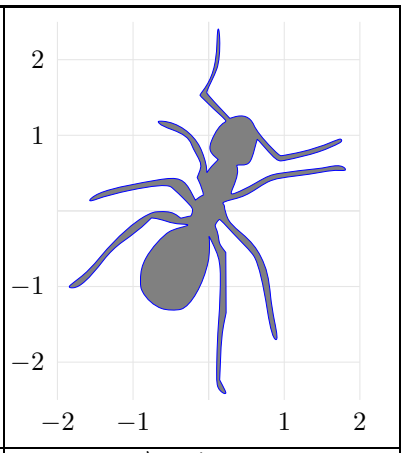
	
\psBill	\psFish



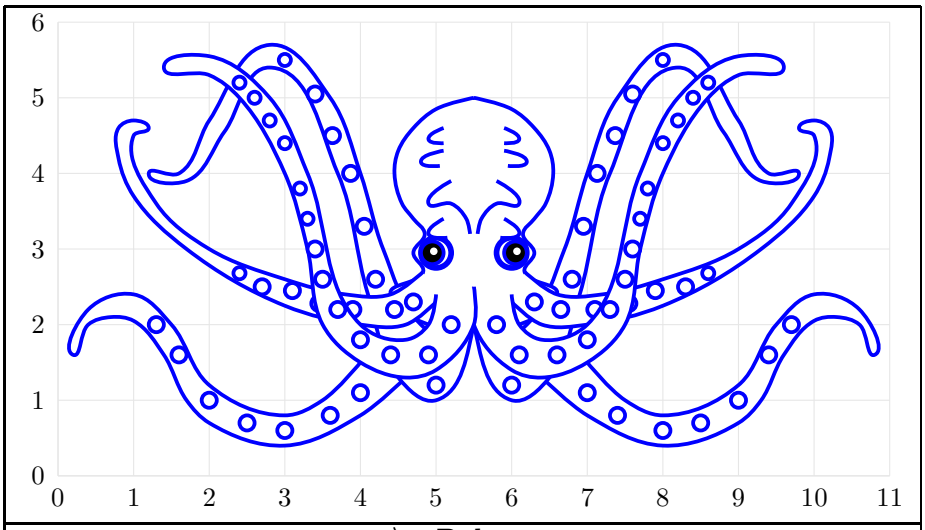
\psLouisXIII



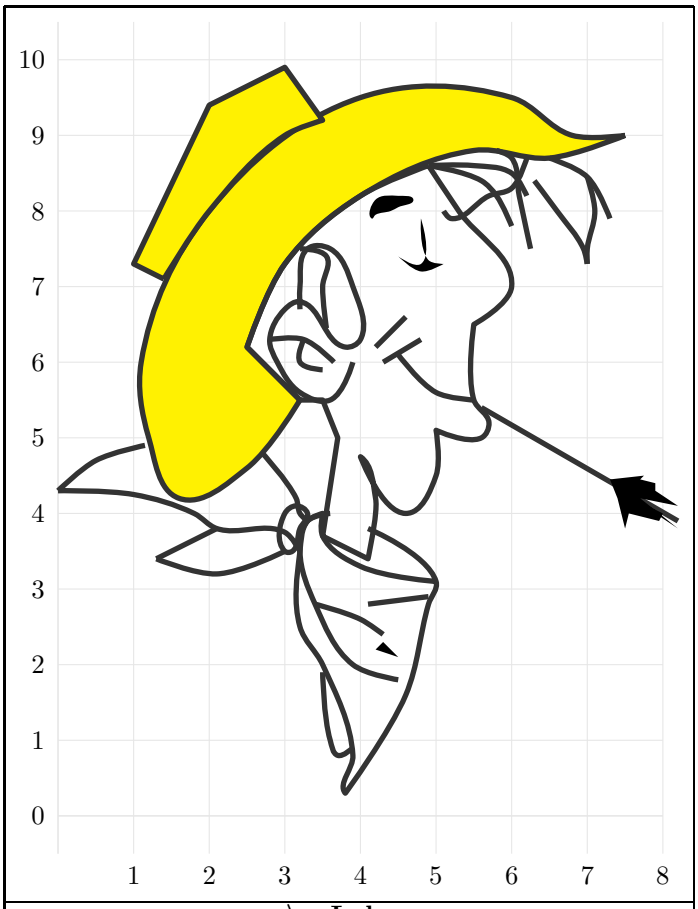
\psBird



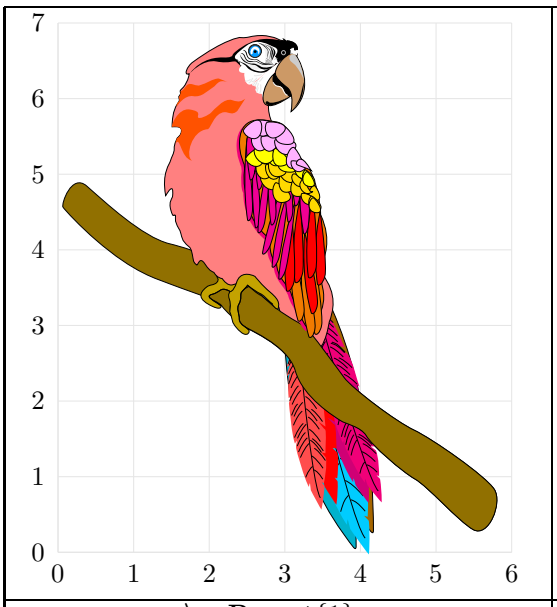
\psAnt



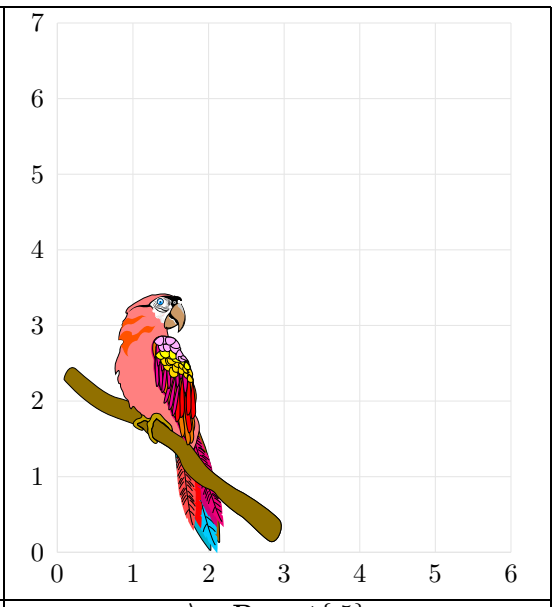
\psPulpo



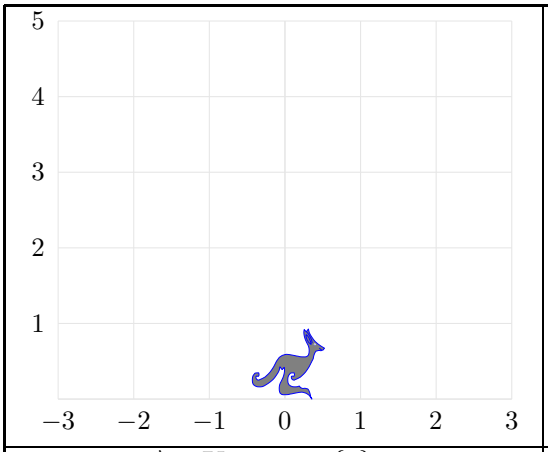
\psLuke



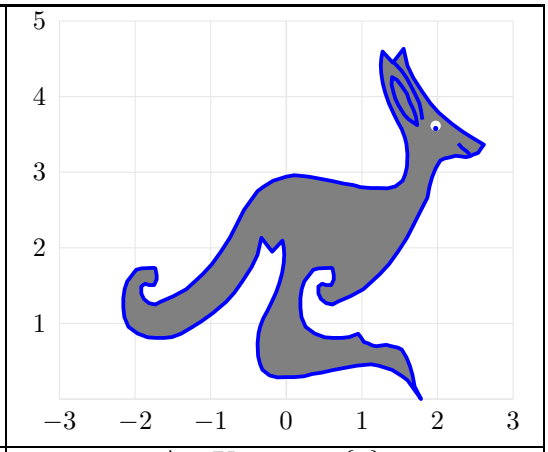
\psParrot{1}



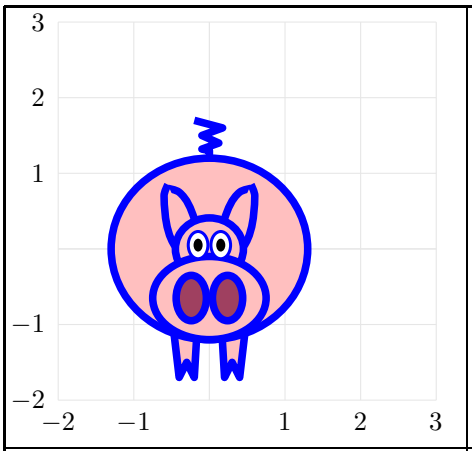
\psParrot{.5}



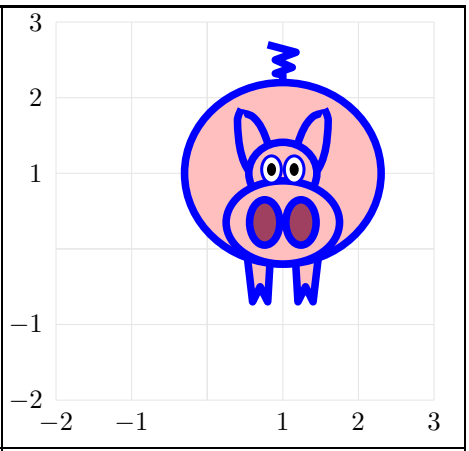
\psKangaroo{1}



\psKangaroo{5}

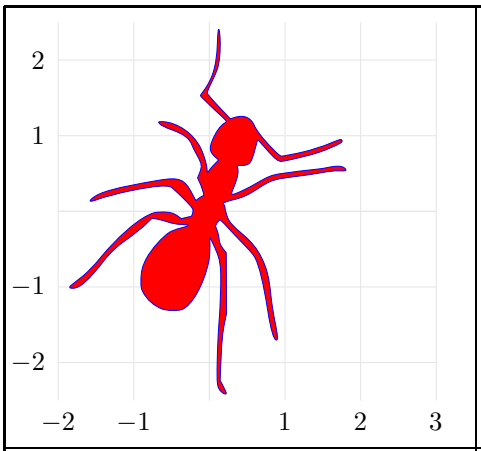


\psPig(0,0)

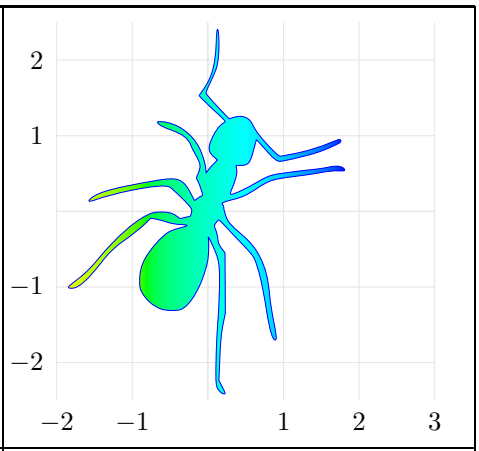


\psPig(1,1)

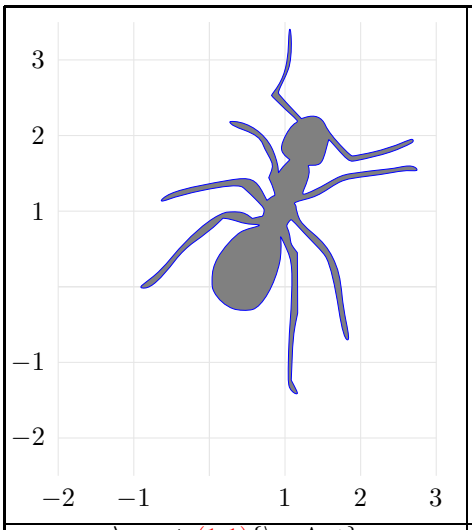
25.2.2 options



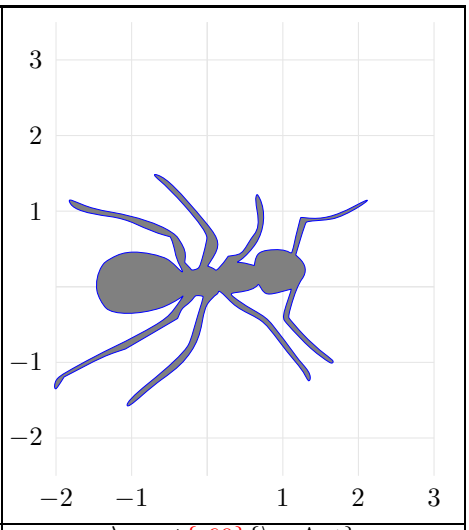
\psAnt[fillcolor=red]



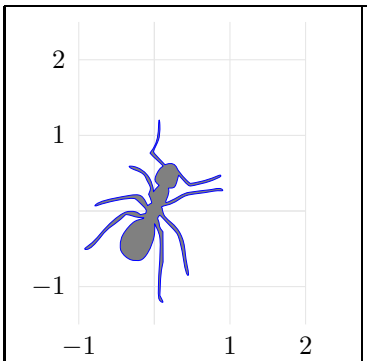
\psAnt[fillstyle=slope]



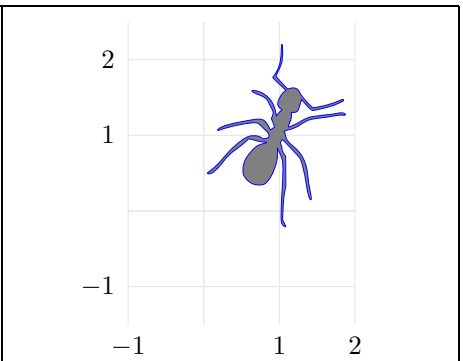
\rput (1,1){\psAnt}



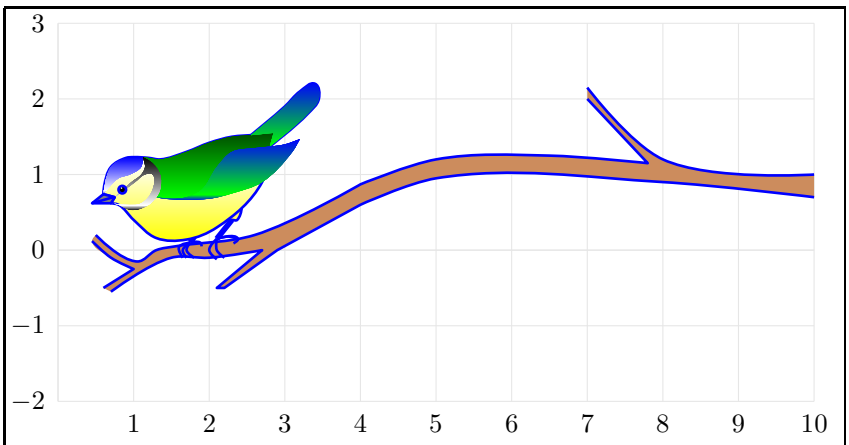
\rput{-60}{\psAnt}



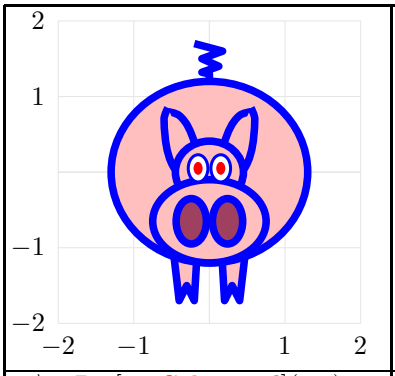
\psscalebox{0.5}{\psAnt}



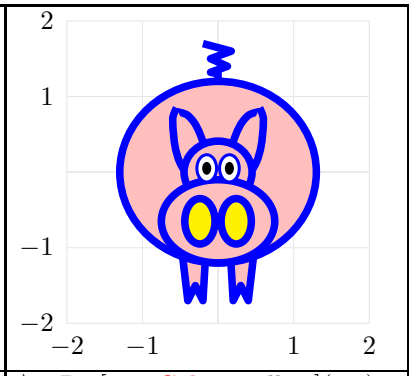
\rput{\psscalebox{0.5}{\psAnt} }



\psBird[Branch]



\psPig[eyeColor=red](0,0)



\psPig[noseColor=yellow](0,0)

26 Create a graph

Utilisation du module **pst-plot**

26.1 Environnement

26.1.1 pspicture

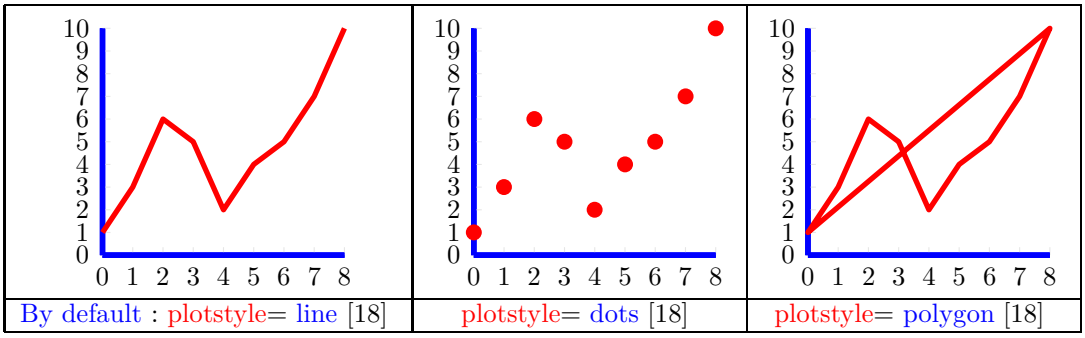
— Axes : Macro **\psaxes**
— Quadrillages : Macro **\psgrid**

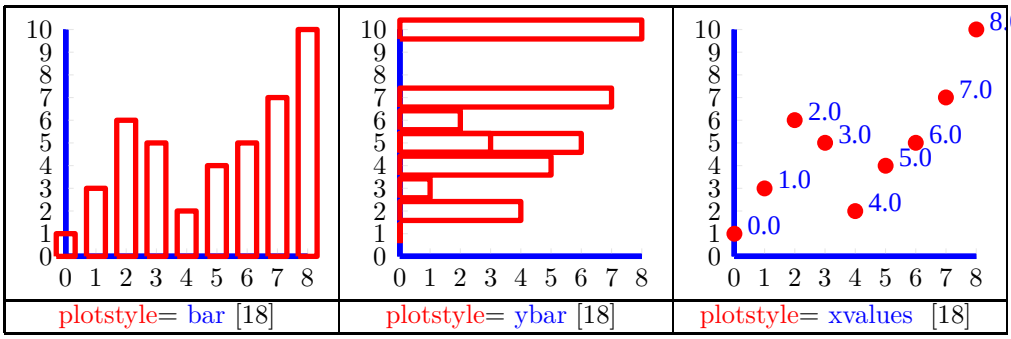
26.1.2 psgraph

Two syntaxes :
\psgraph[Options] {arrows}(xOrig,yOrig)(xMin,yMin)(xMax,yMax){graph width} {graph height} **\endpsgraph**
or
\begin{psgraph} [Options]{arrows}(xOrig,yOrig)(xMin,yMin)(xMax,yMax) {graph width}{graph height} . . . **\end{psgraph}**

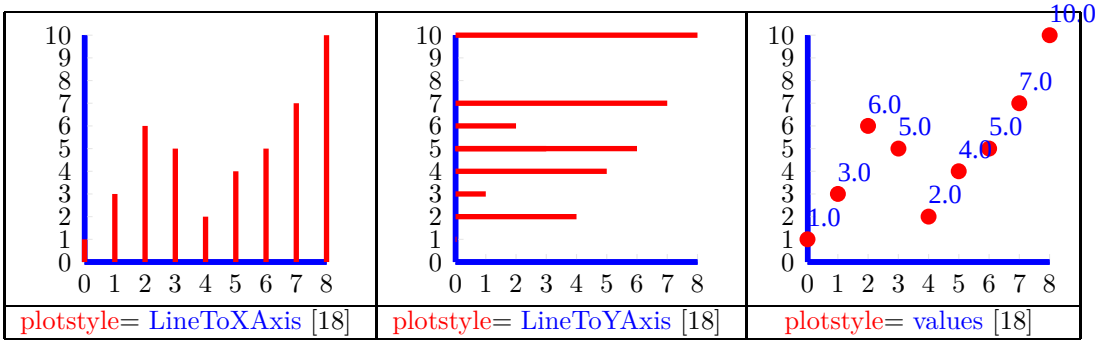
Remarks :
— The indication of the width and height of the graph allow automatic scaling
— If graph height =! , Both axes have the same unit

26.2 Type of graph

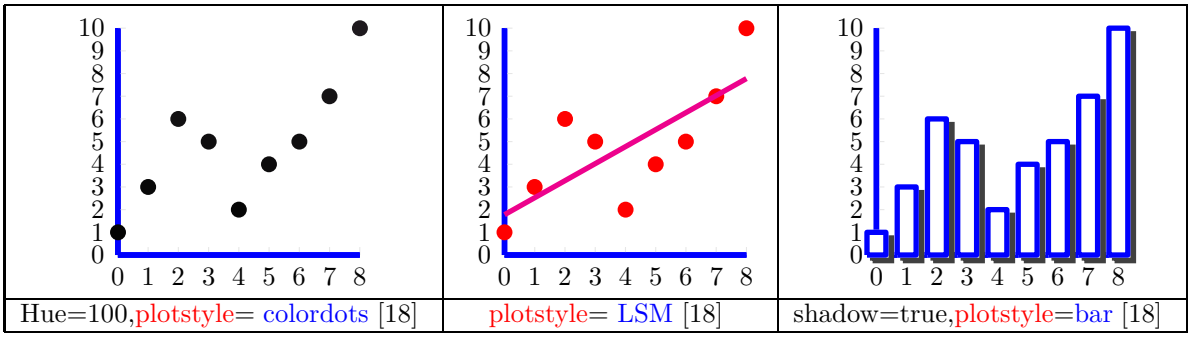




plotstyle= bar [18] | plotstyle= ybar [18] | plotstyle= xvalues [18]



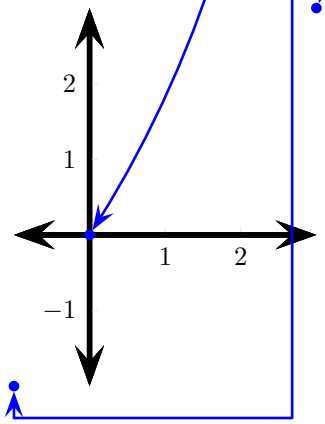
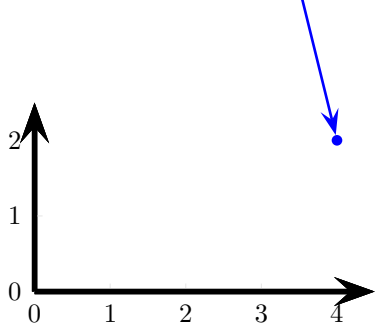
plotstyle= LineToXAxis [18] | plotstyle= LineToYAxis [18] | plotstyle= values [18]



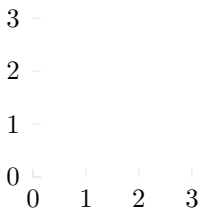
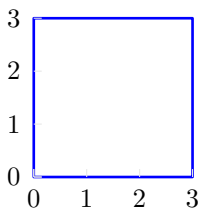
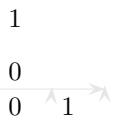
Hue=100,plotstyle= colordots [18] | plotstyle= LSM [18] | shadow=true,plotstyle=bar [18]

26.3 Axes

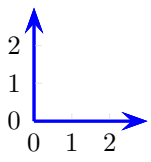
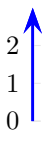
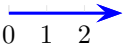
26.3.1 Dimensioning

\psaxes{<->}(0,0)(-1,-2)(3,3)	\psaxes{->}(4,2)
	

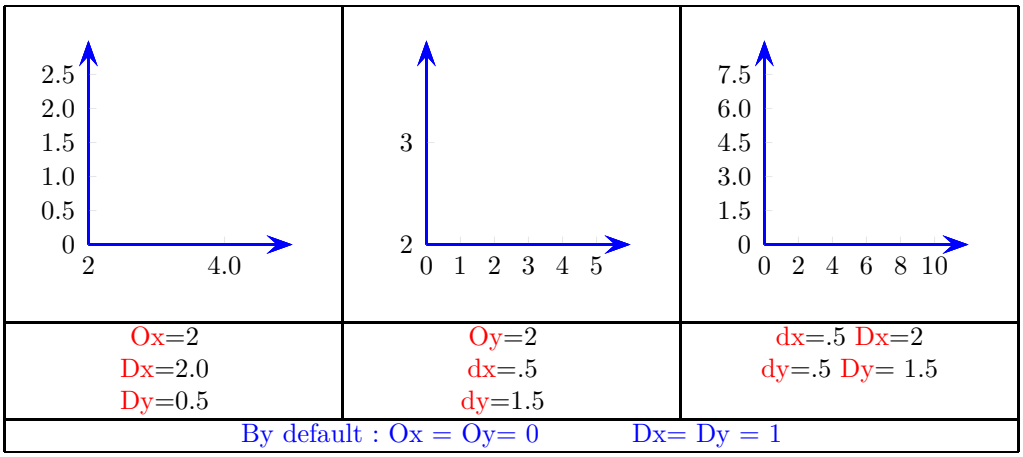
26.3.2 Types d'axes

		
axesstyle=none	axesstyle=frame	axesstyle=polar
By default : axesstyle=axes		

26.3.3 choice of axes

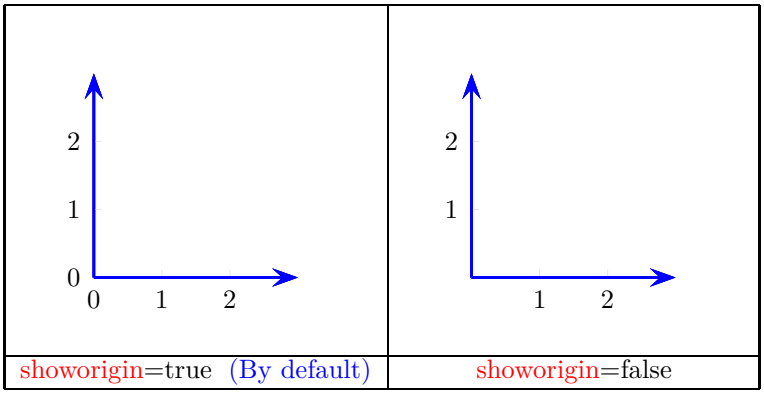
			
xyAxes=true	xyAxes=false	xAxis=false	yAxis=false
By default : xAxis = yAxis = xyAxes = true			

26.3.4 Units of the axis



Ox=2 Dx=2.0 Dy=0.5	Oy=2 dx=.5 dy=1.5	dx=.5 Dx=2 dy=.5 Dy= 1.5
By default : Ox = Oy= 0 Dx= Dy = 1		

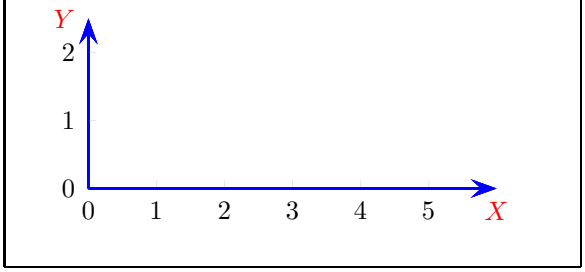
26.3.5 Origin



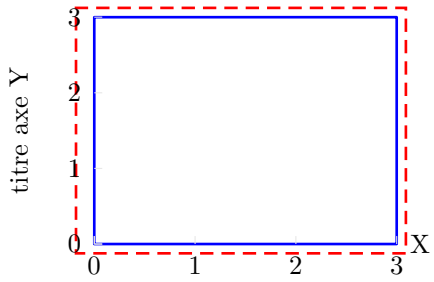
showorigin=true (By default)	showorigin=false

26.3.6 Titles on axes

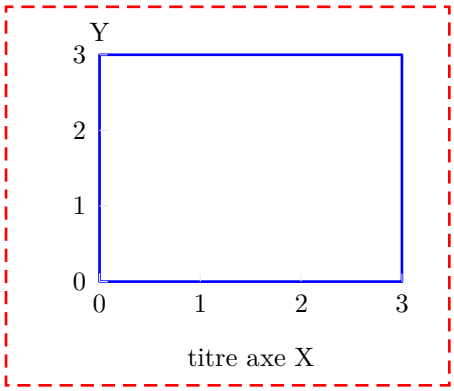
\psaxes{->}(0,0)(6,5)[X,-90][Y,180]



\psset{llx=0,lly=0,urx=0,ury=0,xAxisLabel=X,yAxisLabel=titre axe Y,yAxisLabelPos={-1cm,c}}



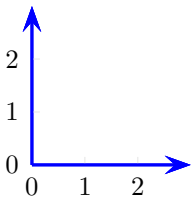
xAxisLabel=X
yAxisLabel=titre axe Y
llx=0
lly=0
urx=0
ury=0
yAxisLabelPos={-1cm,c}



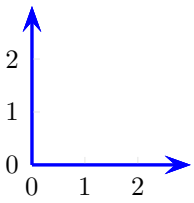
xAxisLabel=titre axe X
yAxisLabel= Y
llx=-1cm
lly=-1.25cm
urx=.5cm
ury=.5cm
xAxisLabelPos={c,-1cm}

26.4 Ticks marks

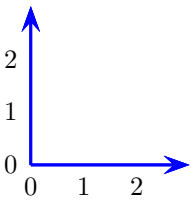
26.4.1 Style of the tick marks



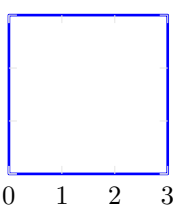
tickstyle=full (By default)



tickstyle=top

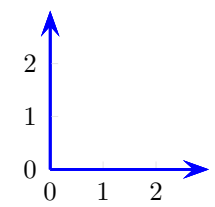
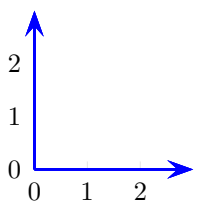
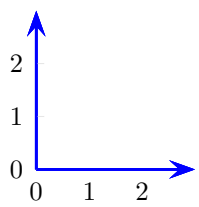
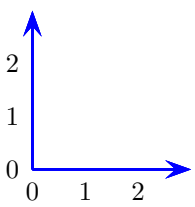


tickstyle=bottom

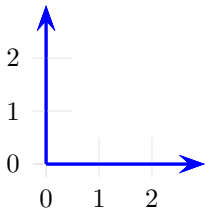
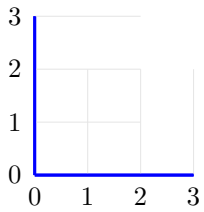
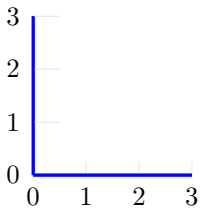


tickstyle=inner
axesstyle=frame

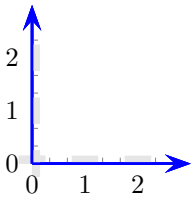
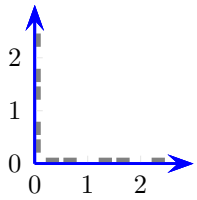
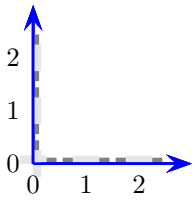
26.4.2 Ticks on axes

			
ticks=all (By default)	ticks=x	ticks=y	ticks=none

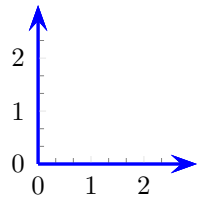
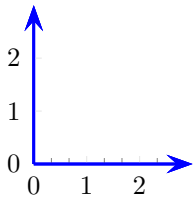
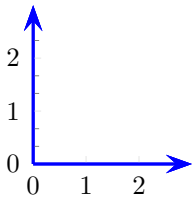
26.4.3 Size of ticks marks

		
ticksize=5pt 10pt	xticksize=2	xticksize=5pt 0pt
	yticksize=2	yticksize=10pt 0pt
By default : ticksize = xticksize = yticksize = -4pt 4pt		

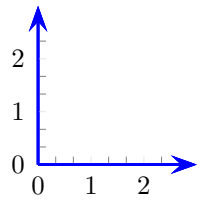
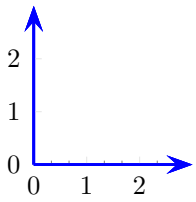
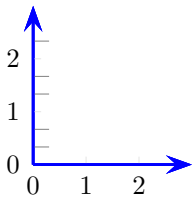
26.4.4 Width of ticks marks

		
tickwidth=10pt	subtickwidth=5pt	tickwidth=1em subtickwidth=1ex
By default : tickwidth = subtickwidth = 0.5\pslinewidth		

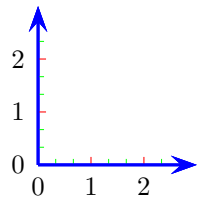
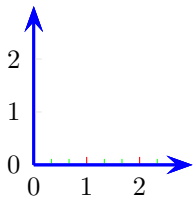
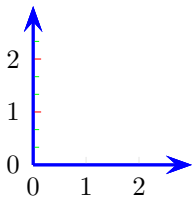
26.4.5 Number of subticks

		
subticks=2	xsubticks=2	ysubticks=2
By defaultsubticks = xsubticks = ysubticks = 0		

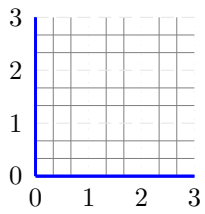
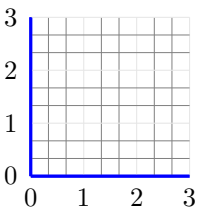
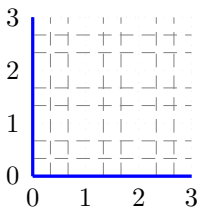
26.4.6 Size of subticks

		
subticksize=1	xsubticksize=.5	ysubticksize=2
By default : subticksize = xsubticksize = subticksize = 0.75		

26.4.7 Color of tick marks

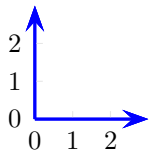
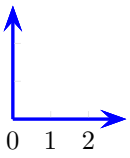
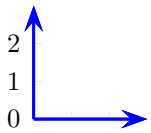
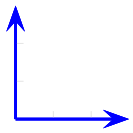
		
tickcolor=red subtickcolor=green	xtickcolor=red xsubtickcolor=green	ytickcolor=red ysubtickcolor=green
By default : tickcolor = xtickcolor = ytickcolor = black subtickcolor = xsubtickcolor = ysubtickcolor = darkgray		

26.4.8 Style of ticks

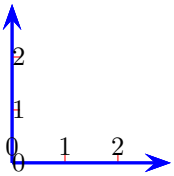
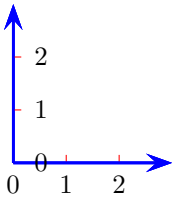
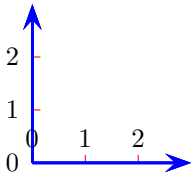
		
yticklinestyle=dashed xticklinestyle=dotted	xsubticklinestyle=solid ysubticklinestyle=none	ticklinestyle= dotted subticklinestyle=dashed
By default : ticklinestyle = xticklinestyle = yticklinestyle = solid subticklinestyle = xsubticklinestyle = ysubticklinestyle = solid		
Option : solid/dashed/dotted/none		

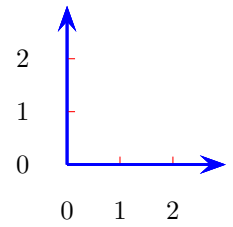
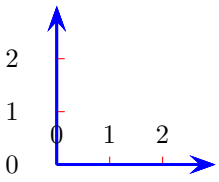
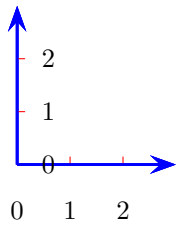
26.5 Labels on axis

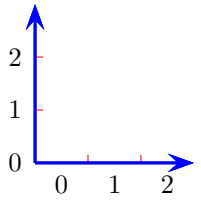
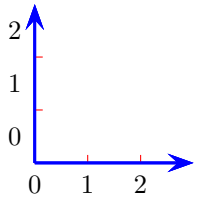
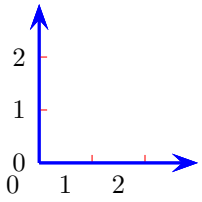
26.5.1 Choice of axis

			
labels= all (By default)	labels=x	labels=y	labels=none

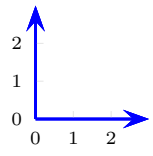
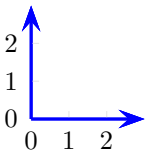
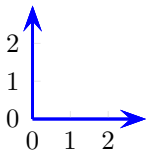
26.6 Position of labels

		
xlabelPos=axis ylabelPos=axis	xlabelPos=bottom (By default) ylabelPos=right	xlabelPos=top ylabelPos=left (By default)

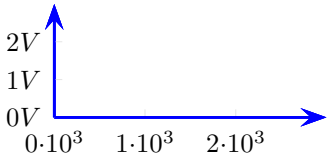
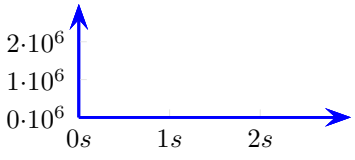
		
labelsep= .5cm	xlabelsep= -.5cm ylabelsep= .5cm	xlabelsep= .5cm ylabelsep=-.5cm
By default : labelsep = 5pt, xlabelsep = 5pt, ylabelsep =5pt		

		
xlabelOffset=0.5	ylabelOffset=0.5	xlabelOffset= -0.5
By default : xlabelOffset =0 , xlabelOffset = 0		

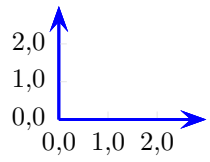
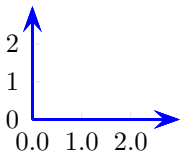
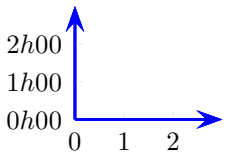
26.6.1 Size of labels

		
labelFontSize=\scriptstyle	xlabelFontSize=\footnotesize	ylabelFontSize=\small

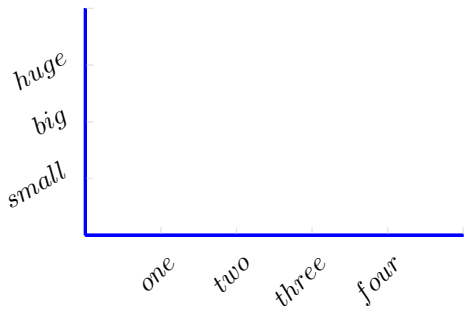
26.6.2 Labels with extra

	
xlabelFactor=\cdot 10^3 ylabelFactor= V	xlabelFactor= s ylabelFactor=$\cdot 10^6$

26.6.3 Decimals in labels

		
comma=true xyDecimals=1	comma= false (By default) xDecimals=1	decimalSeparator=h yDecimals=2

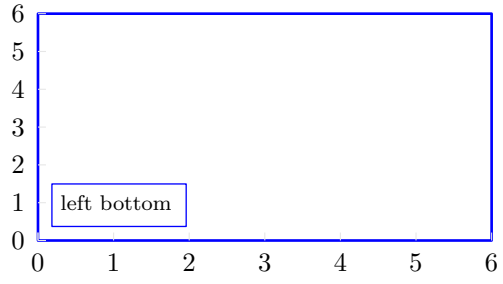
26.6.4 List of labels as axis



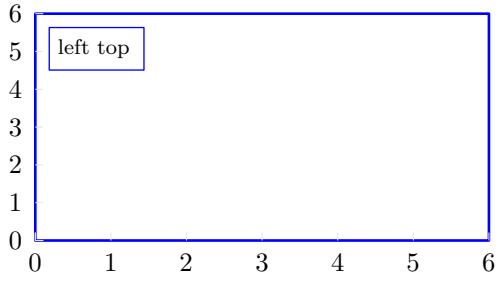
\psaxes[xLabels={,one,two,three,four},xLabelsRot=45,
yLabels={,small,big,huge},yLabelsRot=30](5,4)

26.7 Legend

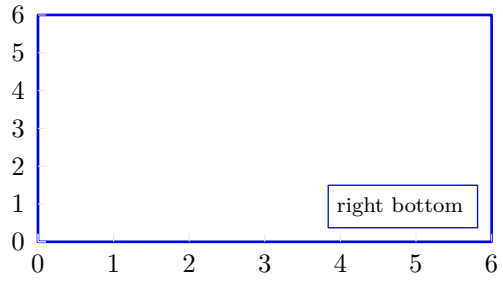
26.7.1 Legend position



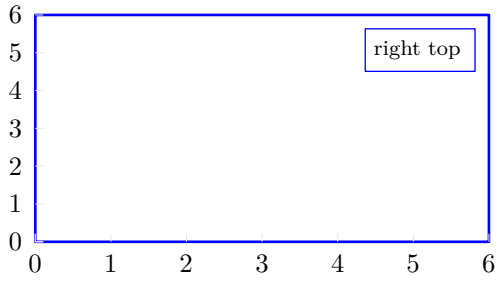
pslegend[lb]{left bottom}



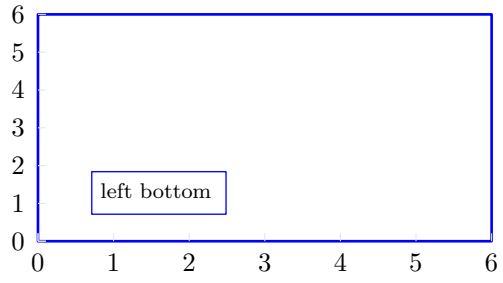
pslegend[lt]{left top}



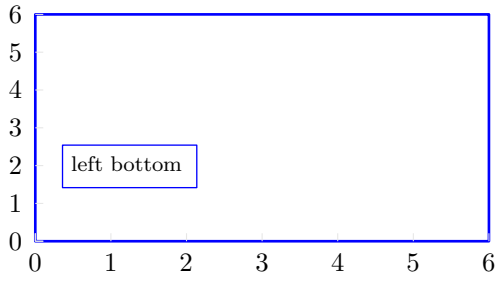
pslegend[rb]{right bottom}



pslegend[rt]{right top} (By default)

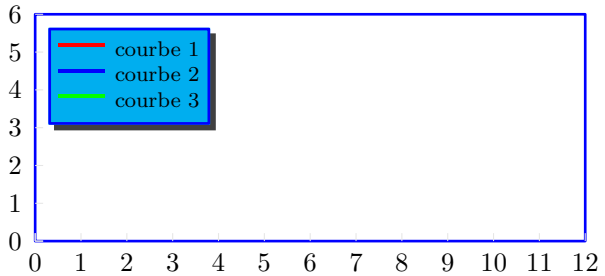


\pslegend[lb](20,10){left bottom}



\pslegend[lb](10,20){left bottom}

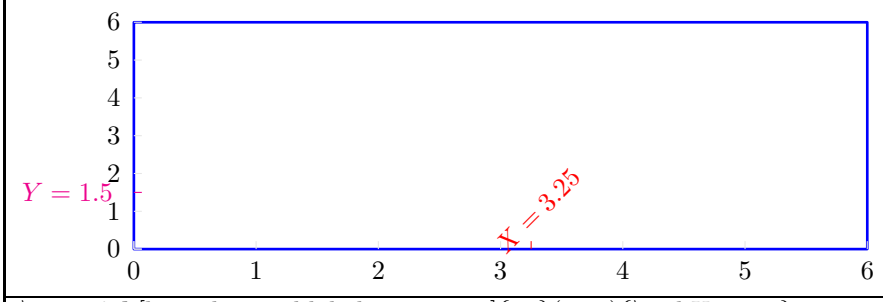
26.7.2 Legend style



newpsstyle{legendstyle} {fillstyle=solid,fillcolor=cyan,shadow=true}
\pslegend[lt]{\red \rule[1ex]{2em} {1pt} & courbe 1 \\
\blue \rule[1ex]{2em}{1pt} & courbe 2 \\
\green \rule[1ex]{2em}{1pt} & courbe 3 }

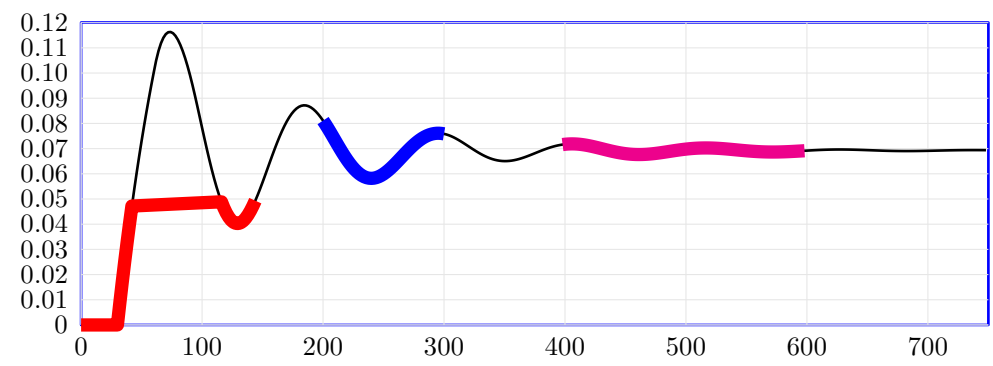
26.8 Point on axes

syntax :
psxTick [Options]{rotation}(x position){label}
psyTick [Options]{rotation}(y position){label}



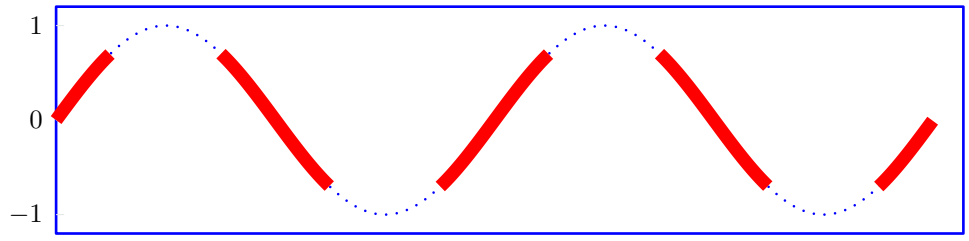

```
\psxTick[linecolor=red,labelsep=-20pt ]{45}(3.25){\red X=3.25}
\psyTick[linecolor=magenta](1.5){\magenta Y=1.5}
```

26.9 Portion of curve




```
\listplot[xStart=200,xEnd=300,linecolor=blue,linewidth=5pt]{\dat}
\listplot[yStart=0,yEnd=.05,linecolor=red,linewidth=5pt]{\dat}
\listplot[nStart=200,nEnd=300,linecolor=magenta,linewidth=5pt]{\dat}
```

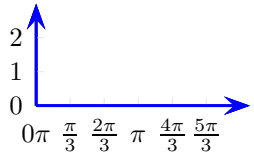
26.10 yMaxValue and yMinValue



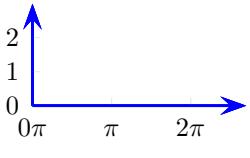
\psplot[yMaxValue=.7,yMinValue=-.7,plotpoints=2000,linecolor=red,linewidth=5pt]{0}{12.56}{sin(x)}

By default yMaxValue= 1.e30 yMinValue = -1.e30

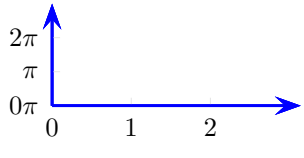
26.11 Axis with trigonmetrical units



trigLabels=true
trigLabelBase=3



xtrigLabels=true
dx=**\pstRadUnit**



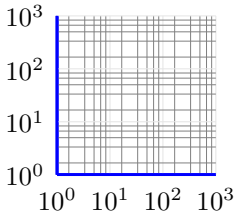
ytrigLabels=true
xunit=\pstRadUnit

By default : trigLabelBase = 0 , trigLabels = false , xtrigLabels = false , ytrigLabels = false

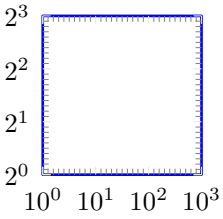
Trigonometrical constants

nom	valeur	math
\psPiFour	12.566371	4π
\psPiTwo	6.283185	2π
\psPi	3.14159265	π
\psPiH	1.570796327	$\pi/2$
\pstRadUnit	1.047198cm	$\pi/3$
\pstRadUnitInv	0.95493cm	$3/\pi$

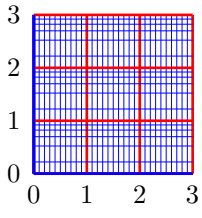
26.12 Logarithmic axis



xylogBase=10
logLines=all
subticks=5

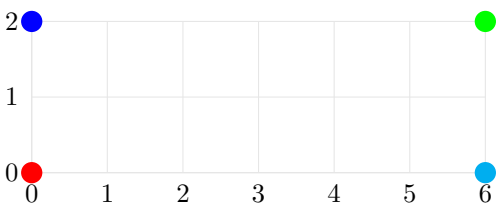


xlogBase=10
ylogBase=2
subticks=10,
tickstyle=inner



ylogBase={}
logLines=all
subticks=5
xsubticks =10

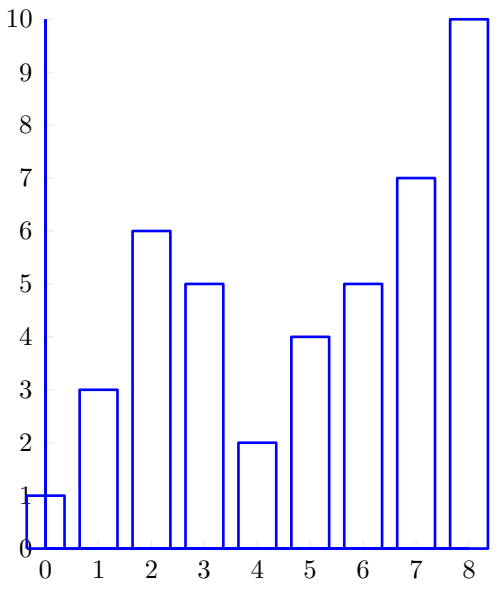
26.13 Coordinates of psgraph




```
\psdot[linecolor=red](\psgraphLLx,\psgraphLLy) [18] [18]
\psdot[linecolor=blue](\psgraphLLx,\psgraphURy) [18]
\psdot[linecolor=cyan](psgraphURx,\psgraphLLy) [18]
\psdot[linecolor=green](\psgraphURx,\psgraphURy)
```

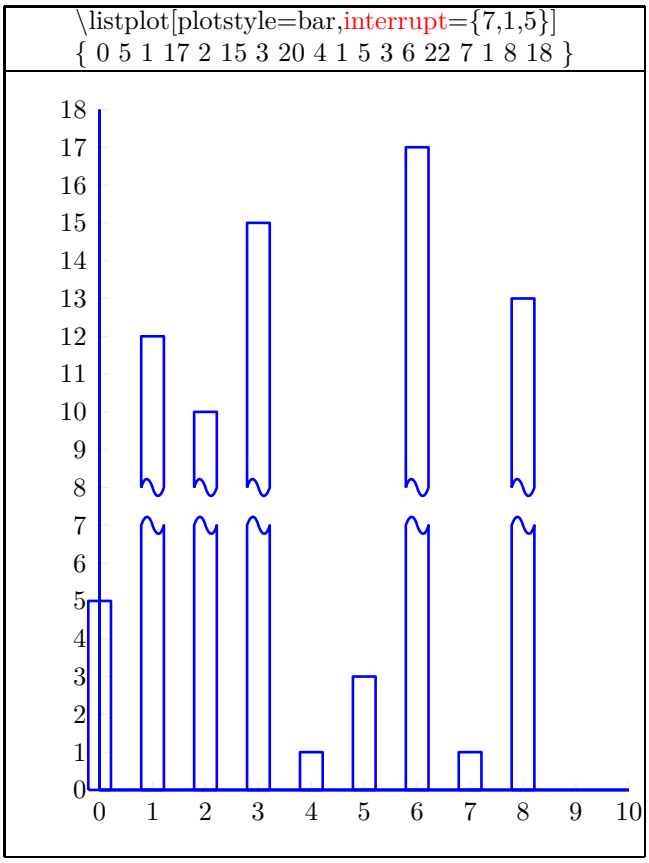
26.14 Parameters of a bar graph

```
\listplot[plotstyle=bar,barwidth=1]{\dat}
```



By default : barwidth = 0.25cm

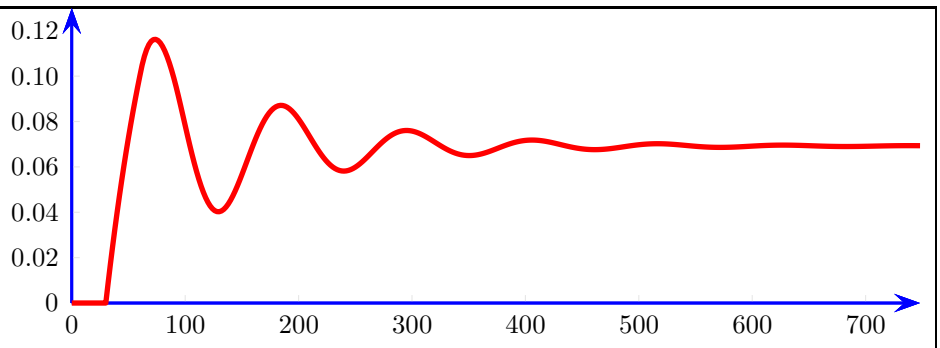
```
\listplot[plotstyle=bar,interrupt={7,1,5}]
{ 0 5 1 17 2 15 3 20 4 1 5 3 6 22 7 1 8 18 }
```



27 Data graph

27.1 Macro fileplot , psfileplot [1] [18]

syntax : **\fileplot** [Options] {file} ou **\psfileplot** [Options] {file}

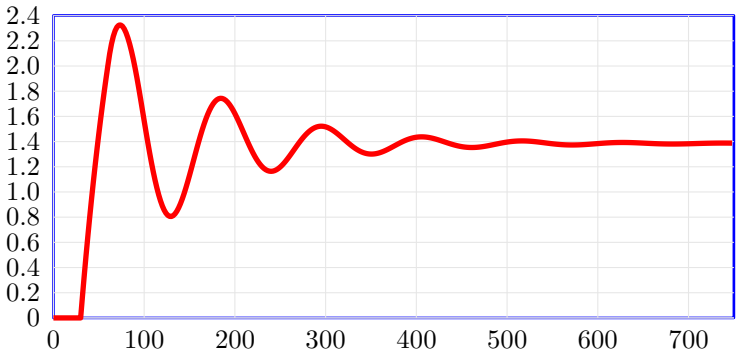


\fileplot[linecolor=red,linewidth=2pt]{mesdata.dat}

option plotstyle : only « line » « polygon » « dots »
Separators of data : « {} » « () » « , » « space »

27.2 Macro dataplot , psdataplot

syntax : **\dataplot** [Options] {\macro} ou **\psdataplot** [Options] {\macro}
It must be preceded by : **\readdata**{\macro}{nomfichier}



\readdata{\dat}{mesdata.dat}
\dataplot[linecolor=red,linewidth=2pt]{\dat}

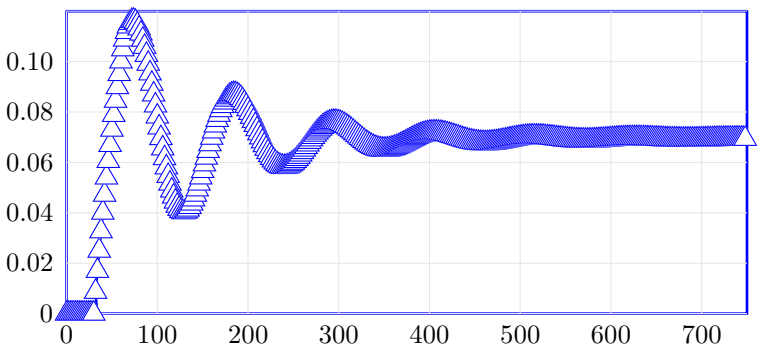
27.3 Macro savedata

syntax : **\savedata**{\macro}[données en XY]

\savedata{\mydata}[{x0, y0}, {x1., y1}, ... {xn., yn}]

27.4 Macro listplot , pslistplot

syntax : **\listplot**{data} **\pslistplot**{data}

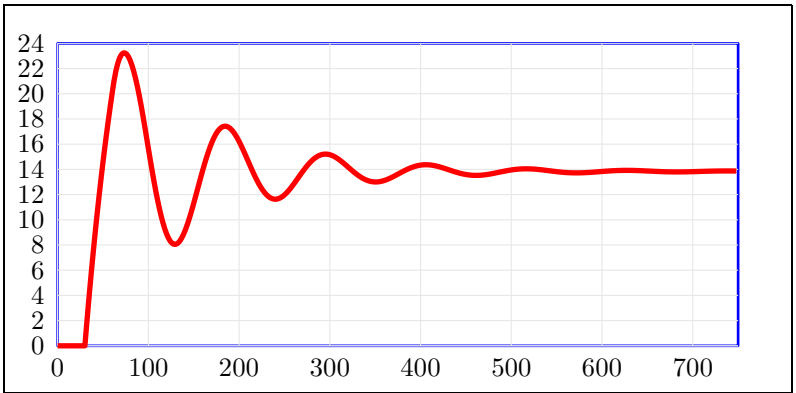


\listplot[plotstyle=curve,showpoints=true,dotstyle=triangle]{\dat}

separator of data : space only !

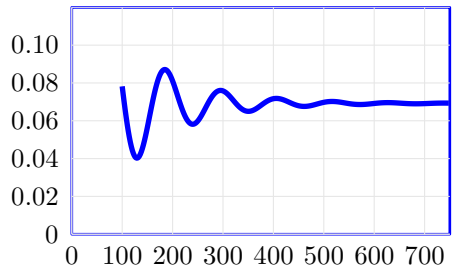
27.5 Scale factor

\pstScalePoints(X scale factor , Y scale factor){PostScript code applied to the x values}{PostScript code applied to the Y values }

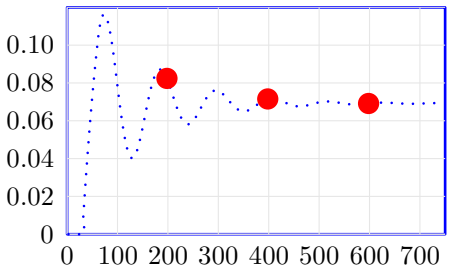


\pstScalePoints(1,100){}{}

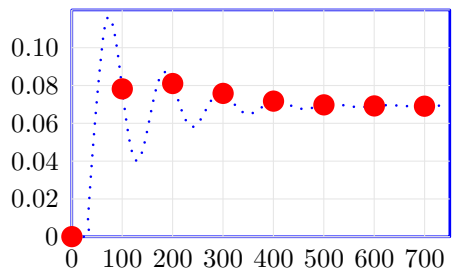
27.6 Options reading the file of data



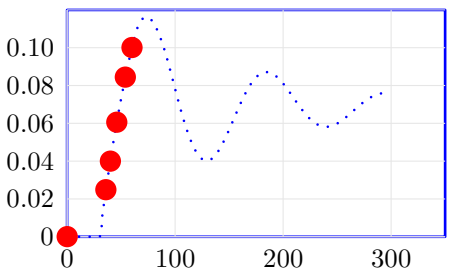
ignoreLines=100



nStep=100



xStep=100



yStep=0.02,xEnd=300

27.7 Multiple data table

The data table has 4 columns of data :

A	B	C	B

\listplot[plotNoMax=3,plotNoX=2,plotNo=2]{\data}
plotNoX=2 :X values on column B plotNoMax=3 :1 columm with x values + 2 columms with y values plotNo=2 :Y values on column C

27.8 Macro sur Excel

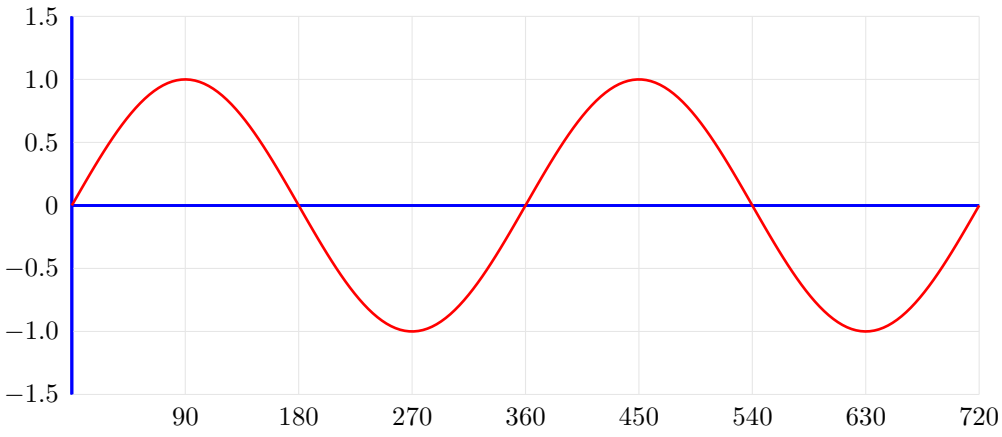
Here is a Visual Basic program to create a data file from an Excel spreadsheet

```
Sub mesdata()
deb = 8                  ' first line of data
fin = 382                ' last line of data
colX = 5                 ' column of the values X
colY = 6                 ' column of the values Y
nom = "mesdata.dat"          ' name of the file

Dim valX, valY As Double

'to erase the file
Open nom For Output Access Write As #1
Close #1

'creation of the file
For i = deb To fin
Open nom For Append As #1
valX = Cells(i, colX)
valY = Cells(i, colY)

Write #1, valX
Write #1, valY
Close #1
Next

End Sub
```

copy this code in a module Excel and modify the parameters deb, fin , colX, colY et nom

28 Equation graph

28.1 Macro psplot

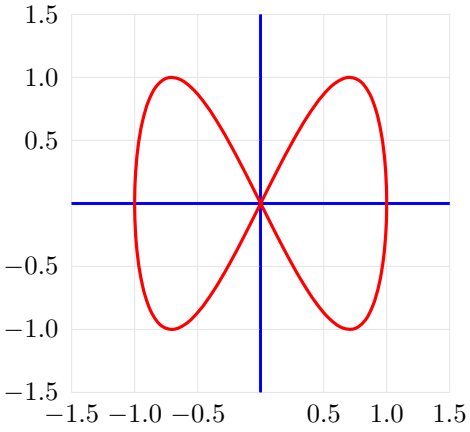


psplot[plotpoints=200,linecolor=red]{0}{720}{x sin}

number of point used x unit : degree Function in postscript code

By default : plotpoints = 50

28.2 Macro parametricplot

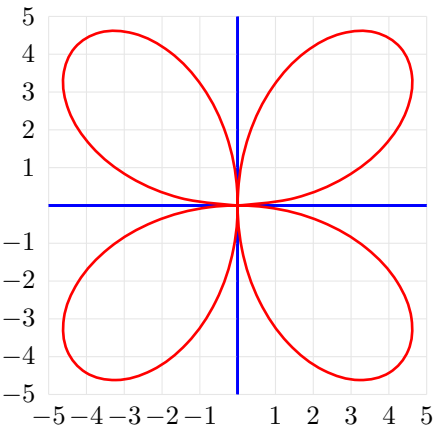


parametricplot[linewidth=1.2pt,plotstyle=ccurve,linecolor=red]
{0}{360 {t sin t 2 mul sin} (functions : $sin(t)$ et $sin(2t)$)

t unit in degree the 2 functions in postscript code !

1. formula in the PostScript language

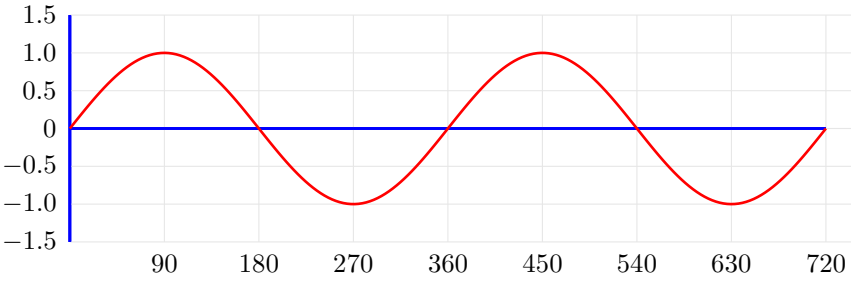
28.3 Polar graph



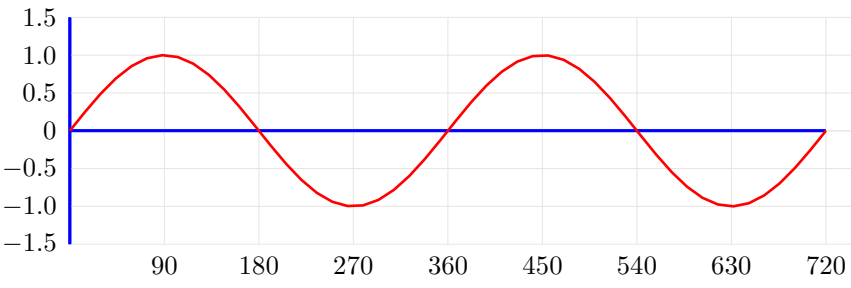
\psplot[plotstyle=curve,polarplot=true,linecolor=red]
{0}{360} { x 2 mul sin 6 mul }

$(6 * sin(2 * x))$

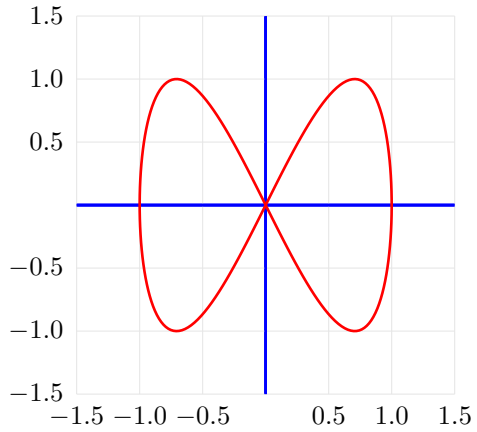
28.4 Modules infix-RPN et pst-infixplot [12]



\infixtoRPN{sin(x)}
\psplot[plotpoints=200]{0}{720}{\RPN}

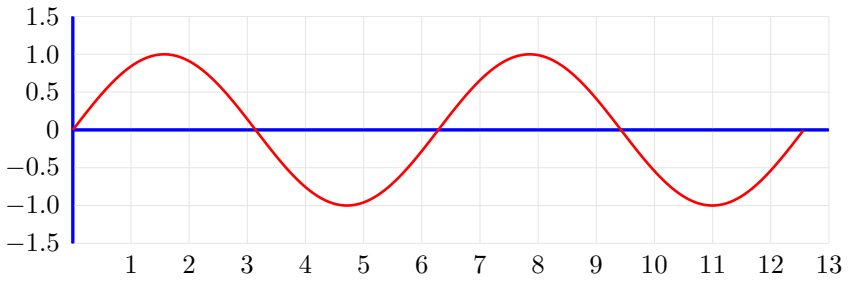


\psPlot{0}{720}{sin(x)}



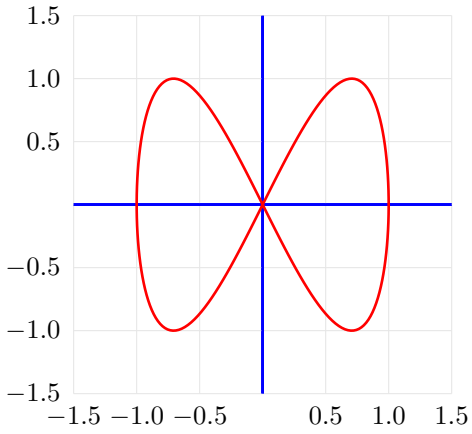
parametricPlot[linecolor=red,plotpoints=200]{0}{360}{sin(t)}{sin(2*t)}

28.5 Option algebraic



\psplot[algebraic,plotpoints=200]{0}{12.56}{sin(x)}

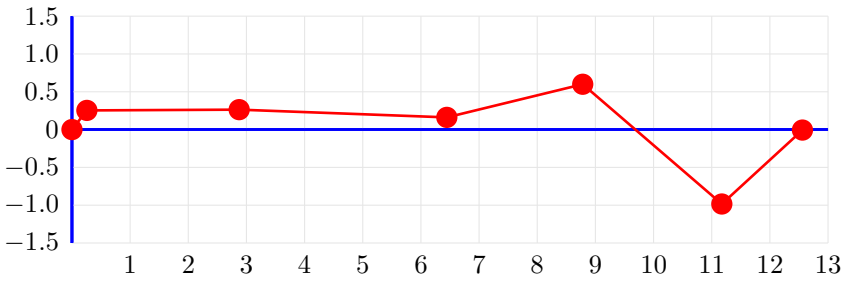
x unit in *radian*



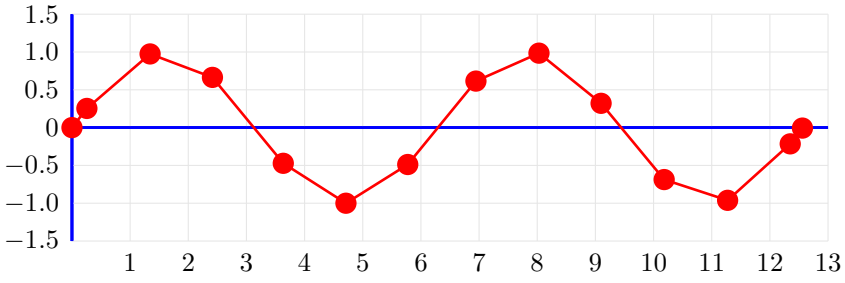
parametricplot[algebraic,plotpoints=200]{0}{6.28}{sin(t)|sin(2*t)}

t unit in *radian*

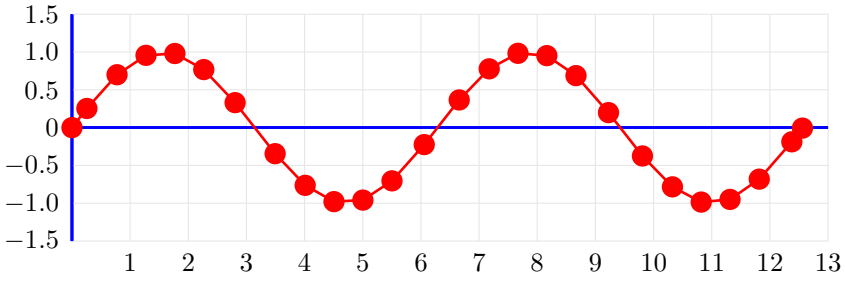
28.6 Options VarStep et VarStepEpsilon




```
\psplot[algebraic,VarStep=true,showpoints=true,VarStepEpsilon=1]0{12.56}{ sin(x)}
```



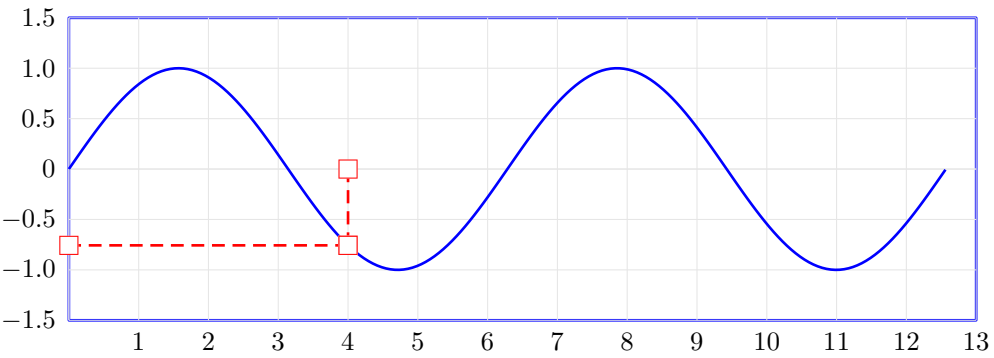

```
\psplot[algebraic,VarStep=true,showpoints=true,VarStepEpsilon=0.1]0{12.56}{ sin(x)}
```




```
\psplot[algebraic,VarStep=true,showpoints=true,VarStepEpsilon=.001]0{12.56}{ sin(x)}
```

29 Tools for graph

29.1 Coordinates of a point



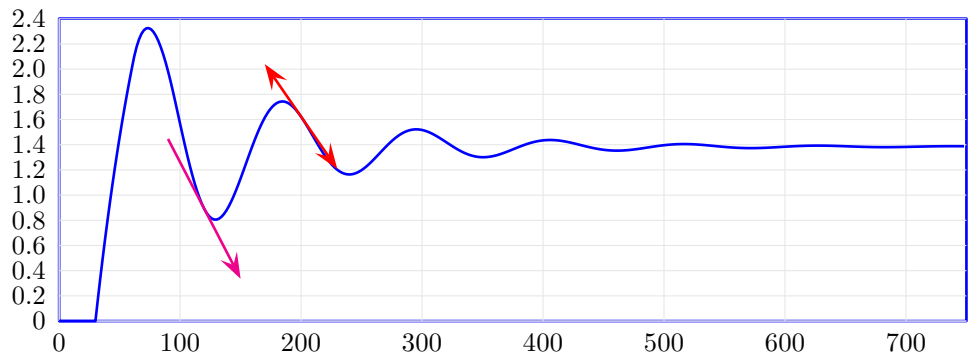
psCoordinates[linecolor=red,linestyle=dashed,dotstyle=square,dotscale=2](*4 {sin(x)})

29.2 Tangente [2]

29.3 Tangent

29.3.1 Tangent to a data file curve

psTangentLine[Options] (x1,y1)(x2,y2)(x3,y3){x}{dx}

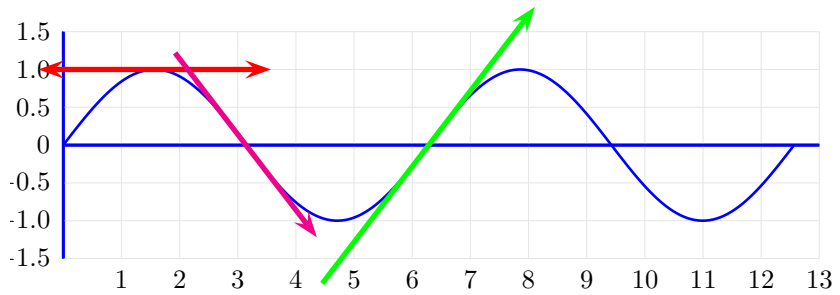


psTangentLine[linecolor=magenta,arrows=->](118,0.0465)(120,0.0445)(122,0.0428){120}{30}
\psTangentLine[linecolor=red,arrows=<->] (198,0.0824)(200,0.0811)(202,0.07962){200}{30}

29.3.2 Tangent to a function curve [2]

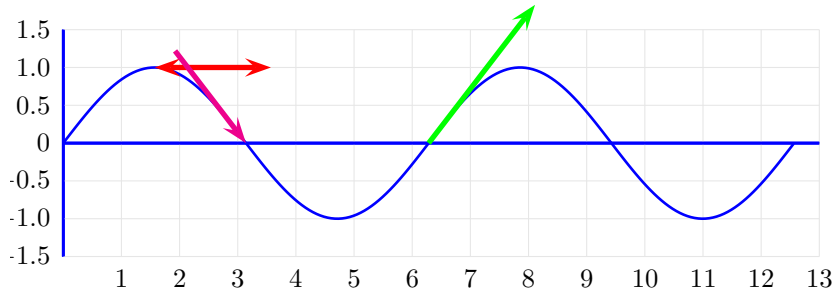
syntax : **\psplotTangent** * [Options] {x}{dx}{function}

Command without asterisk



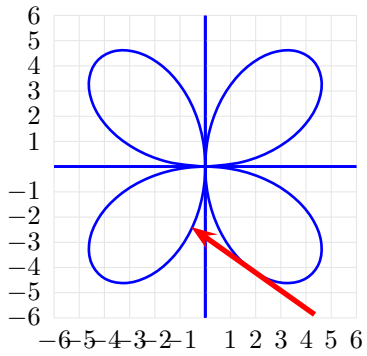
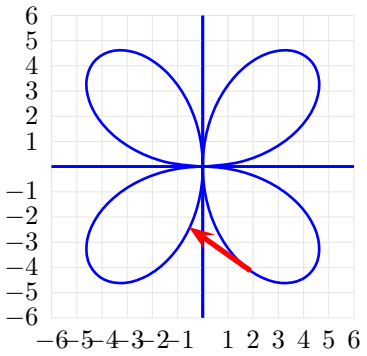

```
\psplotTangent[linecolor=red,arrows=<->]{\psPiH}{2}{sin(x)} [1]
\psplotTangent[linecolor=magenta,arrows=<-]{\psPi}{2}{sin(x)}
\psplotTangent[linecolor=green,arrows=->]{\psPiTwo}{3}{sin(x)}
```

Command with asterisk




```
\psplotTangent*[linecolor=red,arrows=<->]{\psPiH}{2}{sin(x)}
\psplotTangent*[linecolor=magenta,arrows=<-]{\psPi}{2}{sin(x)}
\psplotTangent*[linecolor=green,arrows=->]{\psPiTwo}{3}{sin(x)}
```

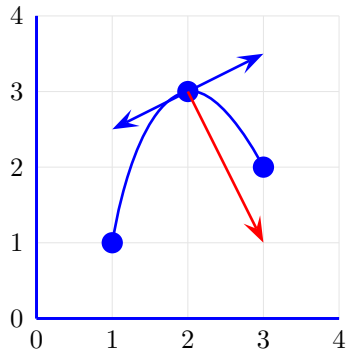
29.3.3 Tangent to a polar curve [2]

Command without asterisk	Command with asterisk
	

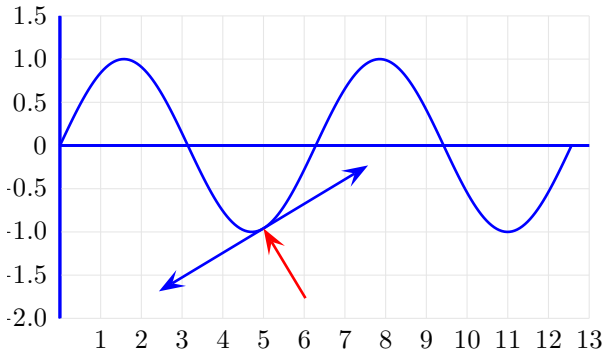

```
\psplotTangent[polarplot,linecolor=red,arrows=->]{2}{3}{6*sin(2*x)} [1]
```

1. arrowscale=2,algebraic=true,linewidth=2pt

29.3.4 Normal of the tangent line [2]

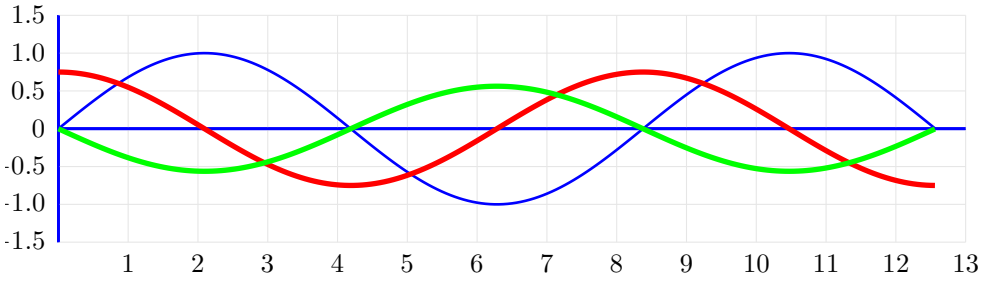


\psTangentLine[Tnormal](1,1)(2,3)(3,2){2}{1}



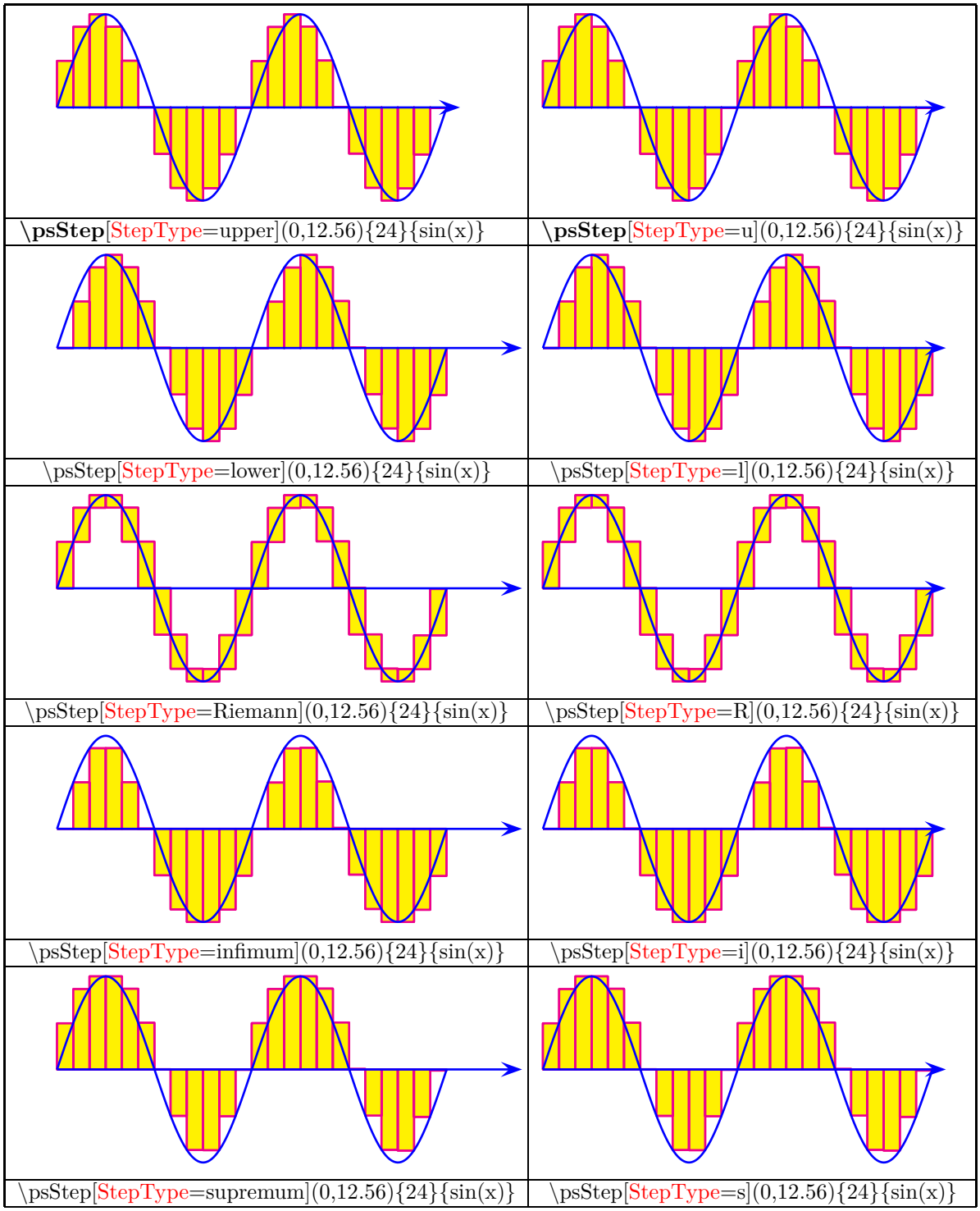
\psplotTangent[Tnormal]5{2}{sin(x)}

29.3.5 Derivatives of a function [2]



\psplot[algebraic,plotpoints=200,linecolor=red]{0}{12.56}{Derive(**1**,sin(.75*x))}
\psplot[algebraic,plotpoints=200,linecolor=green]{0}{12.56}{Derive(**2**,sin(.75*x))}

29.3.6 Riemann integral [2]

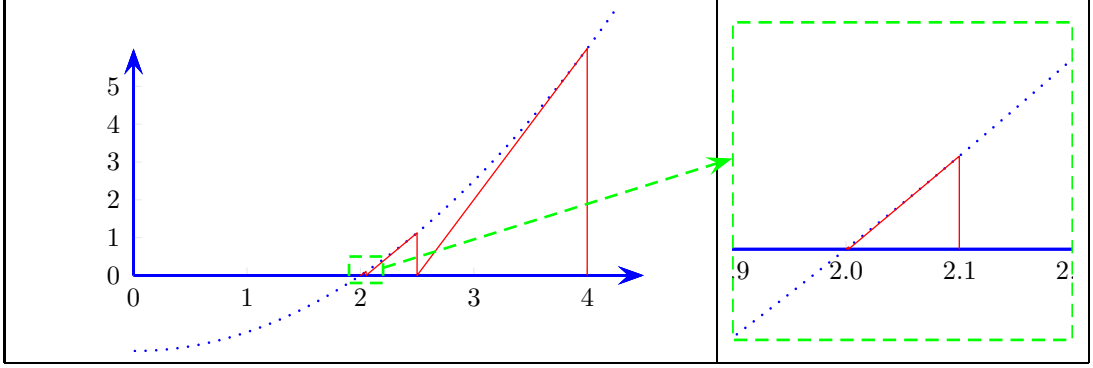


\psStep[StepType=upper](0,12.56){24}{sin(x)}	\psStep[StepType=u](0,12.56){24}{sin(x)}
\psStep[StepType=lower](0,12.56){24}{sin(x)}	\psStep[StepType=l](0,12.56){24}{sin(x)}
\psStep[StepType=Riemann](0,12.56){24}{sin(x)}	\psStep[StepType=R](0,12.56){24}{sin(x)}
\psStep[StepType=infimum](0,12.56){24}{sin(x)}	\psStep[StepType=i](0,12.56){24}{sin(x)}
\psStep[StepType=supremum](0,12.56){24}{sin(x)}	\psStep[StepType=s](0,12.56){24}{sin(x)}

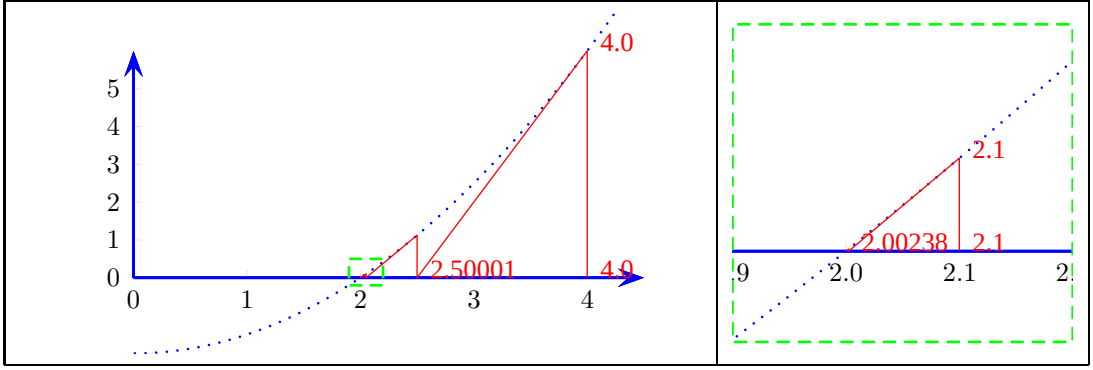
29.3.7 Newton method [18]

syntax : \psNewton [Options] {$x0$} {f(x)} {number of iteration}

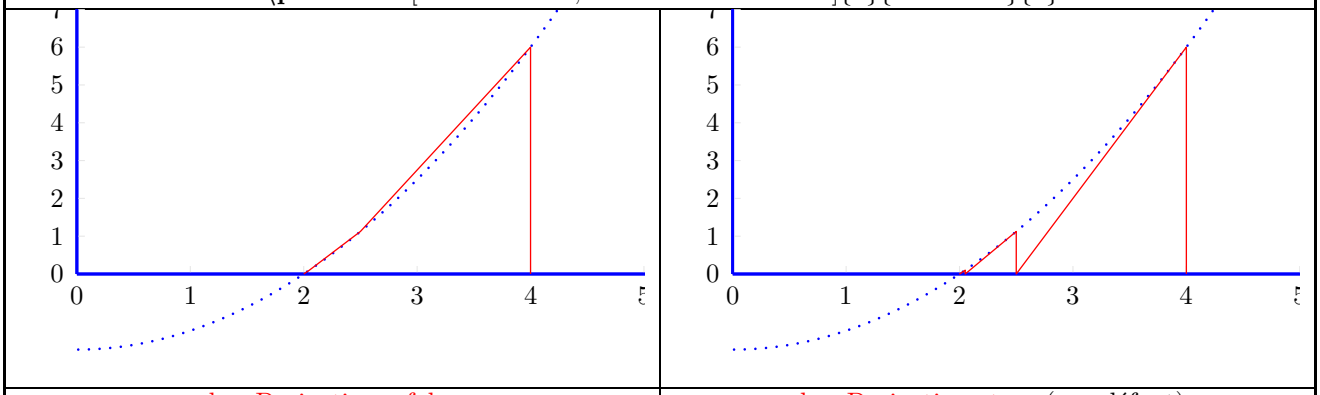
\psplot[algebraic,linestyle=dotted]{0}{12.56}{0.5*x^2-2}
\psNewton[linecolor=red]{4}{0.5*x^2-2}{20}



\psNewton[linecolor=red,plotstyle=xvalues]{4}{0.5*x^2-2}{1}



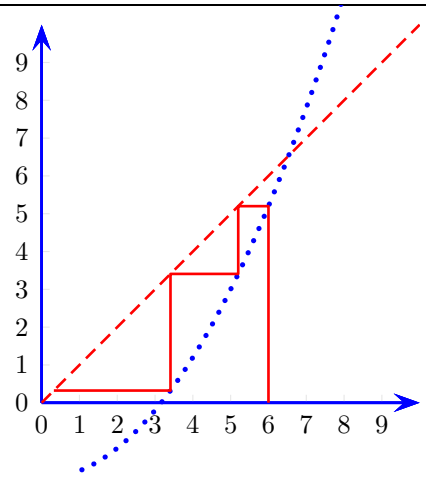
\psNewton[linecolor=red,showDerivation=false]{4}{0.5*x^2-2}{1}



showDerivation =false | showDerivation=true (par défaut)

29.4 Macro psFixpoint [18]

syntax : \psFixpoint [Options] {x_0}{f(x)}{number of iteration}

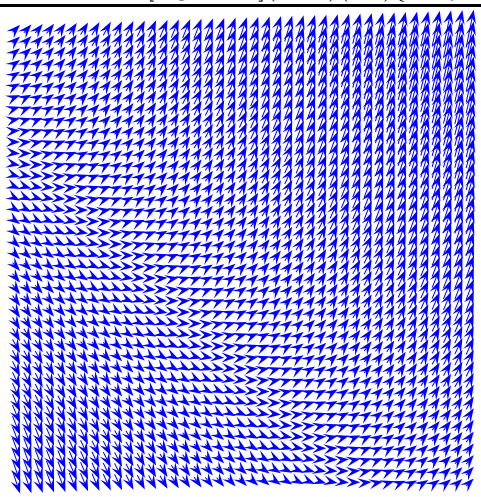



```
\psplot[algebraic,linestyle=dotted]{1}{10}{0.5*x^2-2}
\psline[linecolor=red,linestyle=dashed](10,10)
\psFixpoint[linecolor=red]{6}{0.5*x^2-2}{3}
```

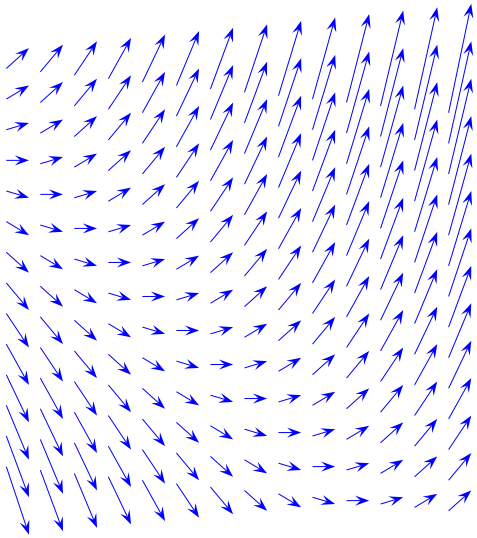
29.5 Macro psVectorfield [18]

Solutions de $\dfrac{dy}{dx} = x + y + 1$

\psVectorfield[algebraic](-2,-2)(2,2){ x+y+1}



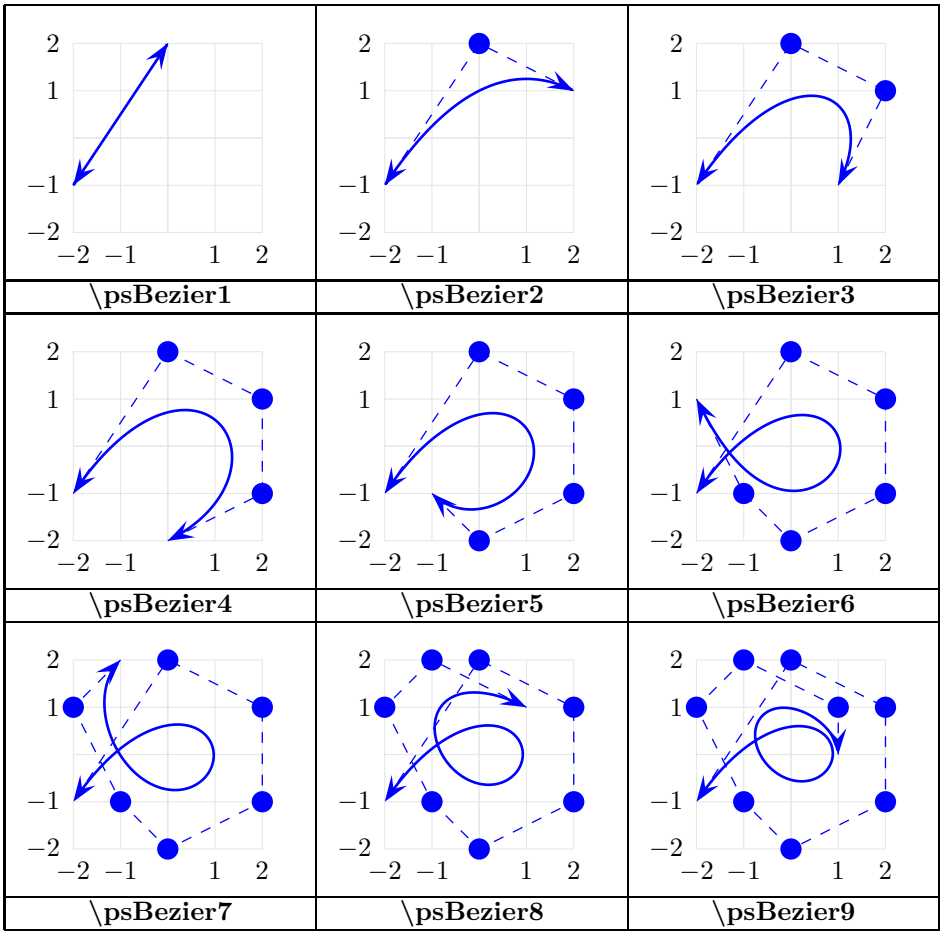
\psVectorfield[algebraic,Dx=0.3,Dy=0.3](-2,-2)(2,2){ x+y+1}



By default : Dx= 0.1 , Dy= 0.1

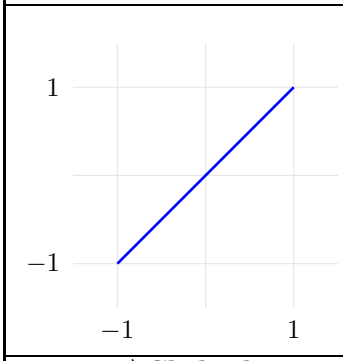
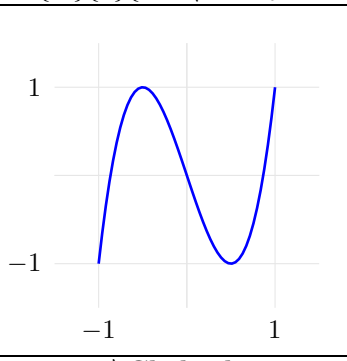
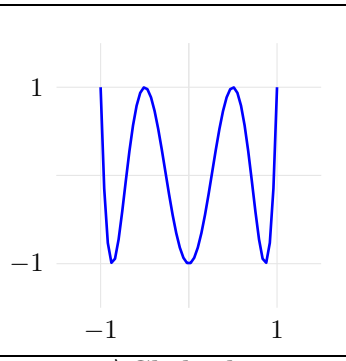
30 mathematical functions

30.1 Bezier curve

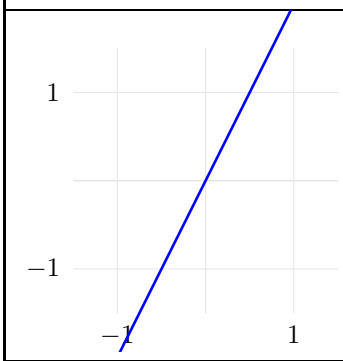
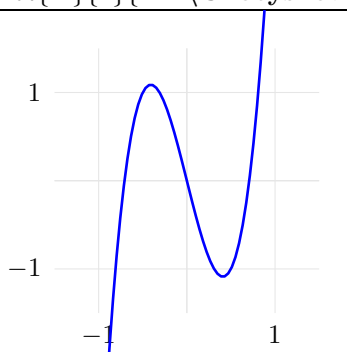
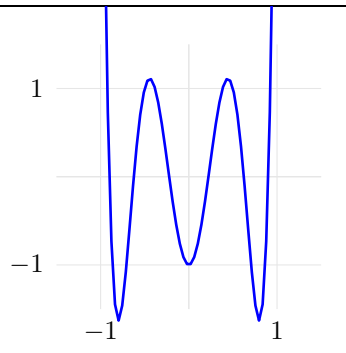


30.2 Chebyshev polynomial

30.2.1 Polynôme de première espèce

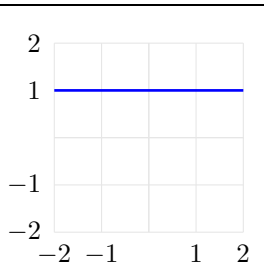
\psplot{-1}{1}{1 x \ChebyshevT }		
		
1 x \ChebyshevT	3 x \ChebyshevT	6 x \ChebyshevT

30.2.2 Polynôme de deuxième espèce

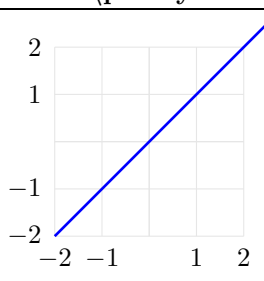
\psplot{-1}{1}{1 x \ChebyshevU }		
		
1 x \ChebyshevU	3 x \ChebyshevU	6 x \ChebyshevU

30.3 Function plynomial

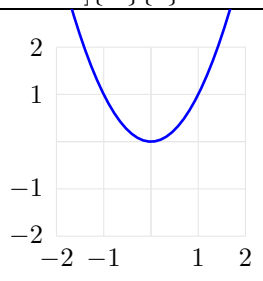
\psPolynomial[coeff= 1]{-2}{2}



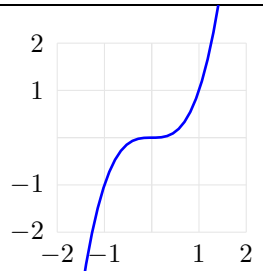
coeff= 1
$f(x) = 1$



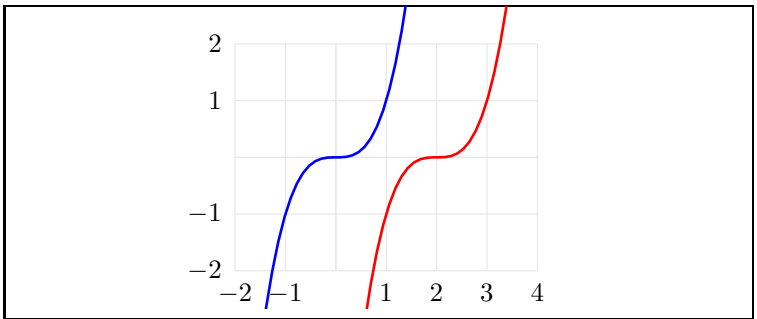
coeff=0 1
$f(x) = x$



coeff=0 1
$f(x) = x^2$

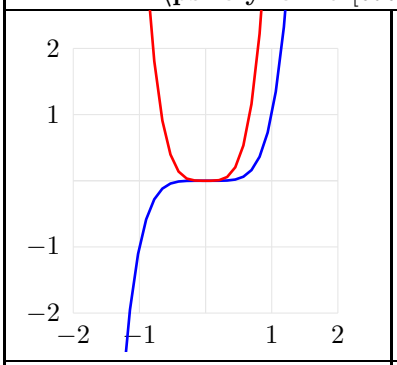


coeff=0 0 01
$f(x) = x^3$

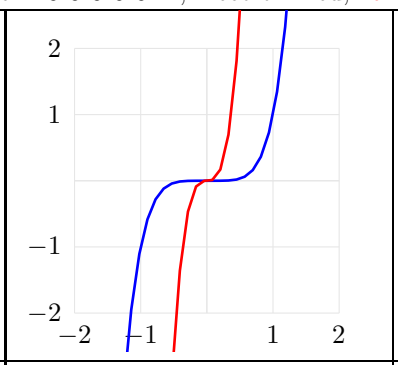


\psPolynomial[coeff=0 0 0 1 ,linecolor=red,xShift=2]{-2}{4}

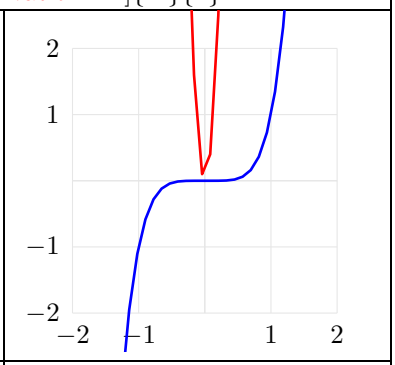
\psPolynomial[coeff=0 0 0 0 0 1 ,linecolor=red,Derivation=1]{-2}{2}



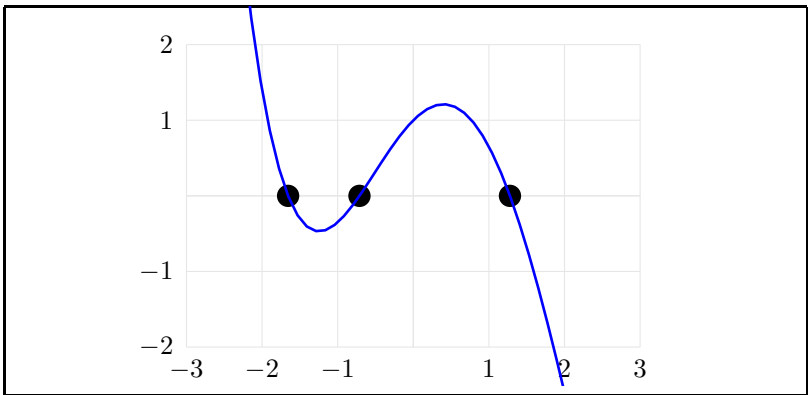
Derivation= 1



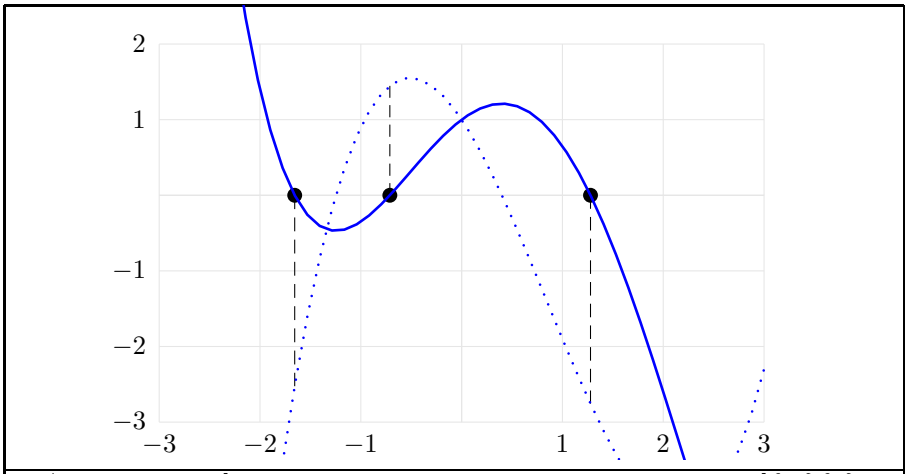
Derivation= 2



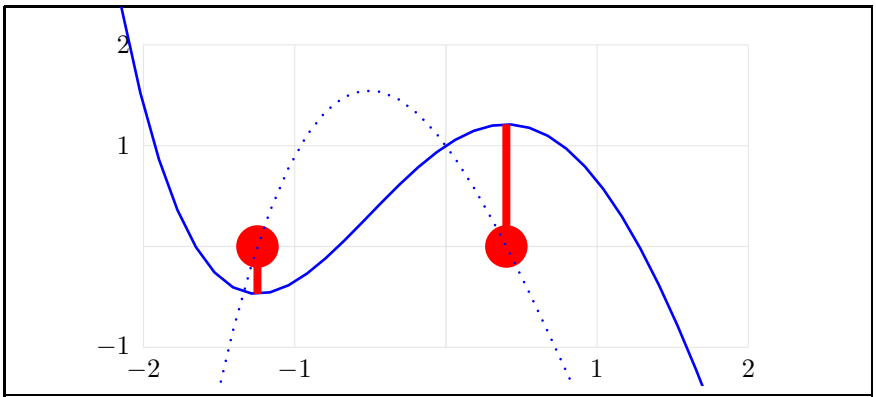
Derivation= 3



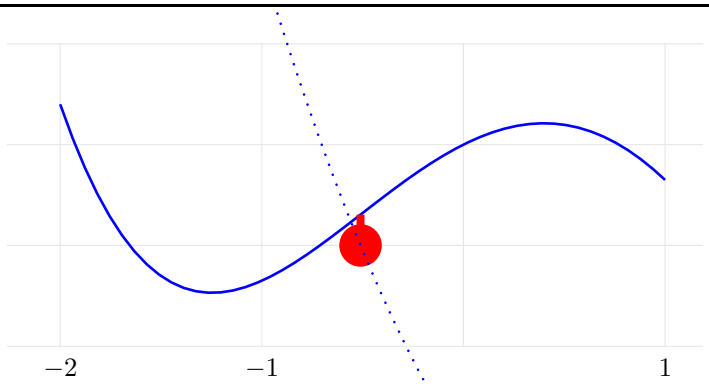

```
\psPolynomial[markZeros,dotscale=3,coeff=1 1 -1 -.5 0.15]{-3}{3}
```




```
\psPolynomial[markZeros,zeroLineTo=1,coeff=1 1 -1 -.5 0.15]{-3}{3}
\psPolynomial[linestyle=dotted,Derivation=1,coeff=1 1 -1 -.5 0.15]{-3}{3}
```

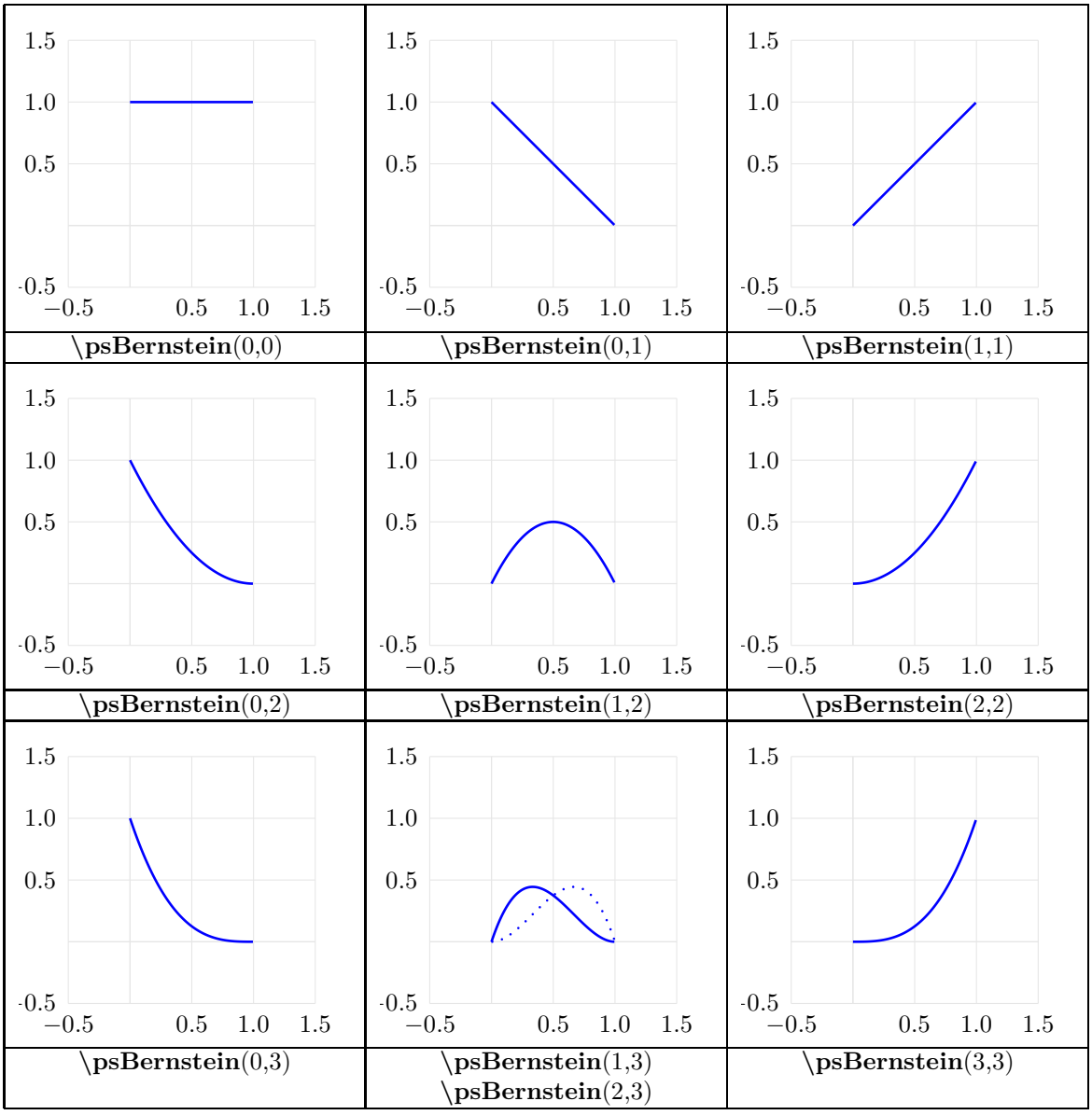



```
\psPolynomial[coeff=1 1 -1 -.5 0.15]{-3}{3}
\psPolynomial[markZeros,linestyle=dotted,Derivation=1,zeroLineTo=0,
zeroLineStyle=solid,zeroLineColor=red,zeroLineWidth=3pt,
coeff=1 1 -1 -.5 0.15]{-3}{3}
```

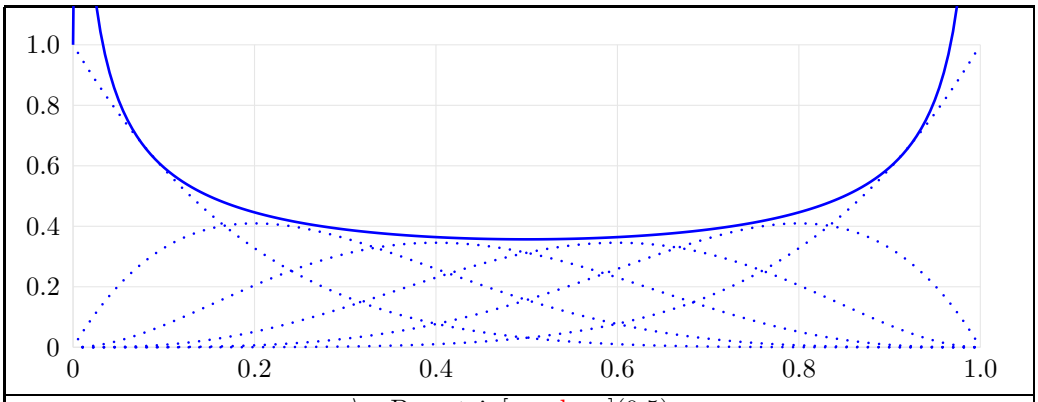



```
\psPolynomial[coeff=1 1 -1 -.5 0.15]{-3}{3}
\psPolynomial[markZeros,linestyle=dotted,Derivation=2,zeroLineTo=0,
    zeroLineStyle=solid,zeroLineColor=red,zeroLineWidth=3pt,
    coeff=1 1 -1 -.5 0.15]{-3}{3}
```

30.4 Bernstein polynomial



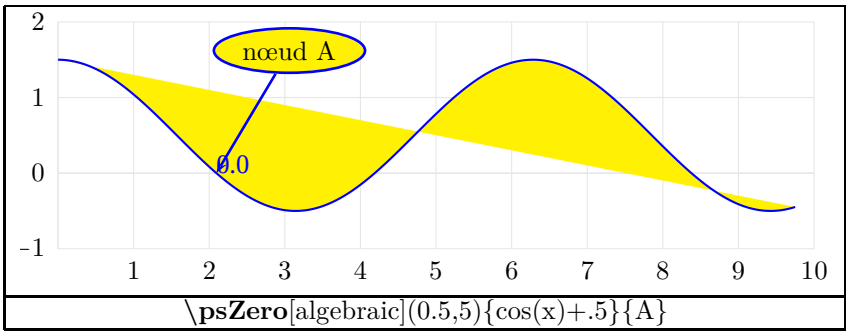
\psBernstein(0,0)	\psBernstein(0,1)	\psBernstein(1,1)
\psBernstein(0,2)	\psBernstein(1,2)	\psBernstein(2,2)
\psBernstein(0,3)	\psBernstein(1,3) \psBernstein(2,3)	\psBernstein(3,3)



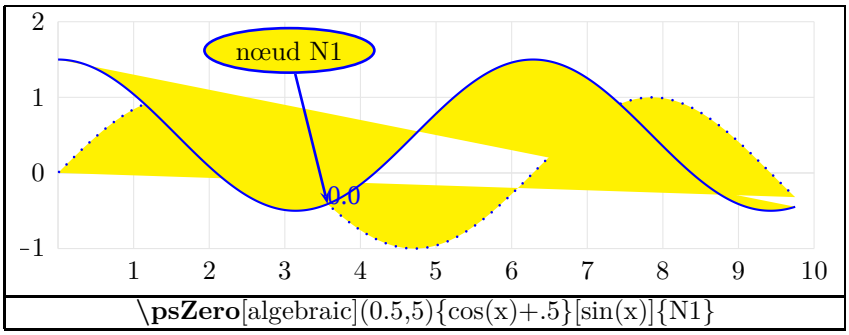
\psBernstein[envelope](0,5)

fonction

30.5 Zeros or intersections

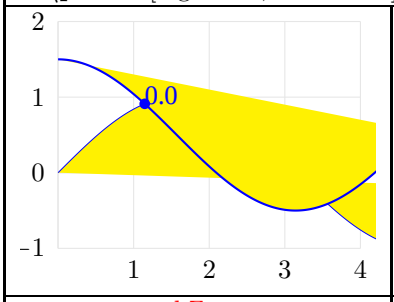


\psZero[algebraic](0.5,5){cos(x)+.5}{A}

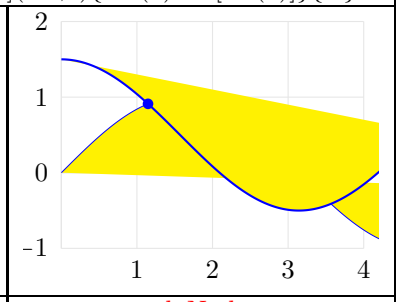


\psZero[algebraic](0.5,5){cos(x)+.5}[sin(x)]{N1}

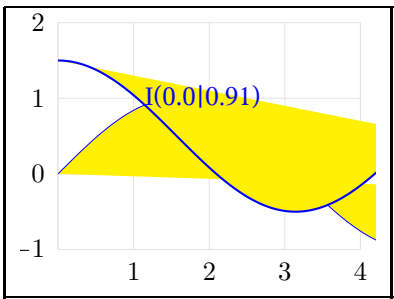
\psZero[algebraic,markZeros](0.5,5){cos(x)+.5[sin(x)]}{A}



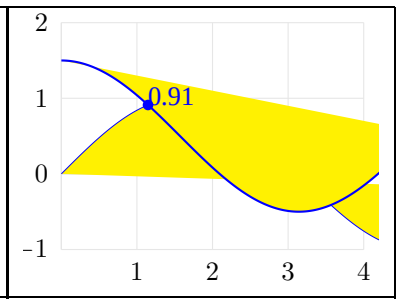
markZeros



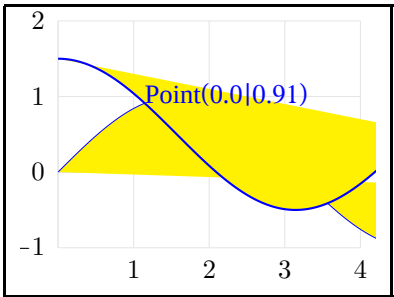
onlyNode



PrintCoord

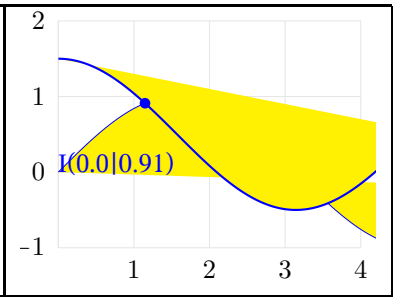


onlyYVal

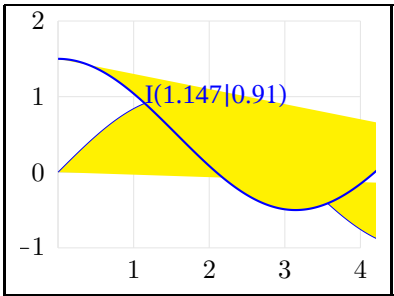


PointName,PrintCoord

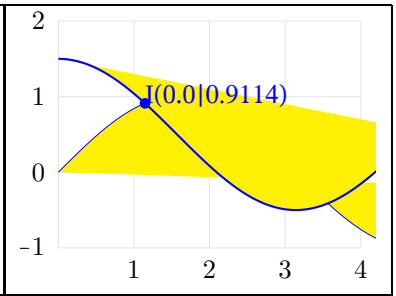
By default : PointName= I



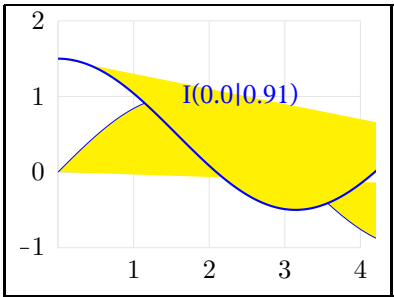
originV,PrintCoord



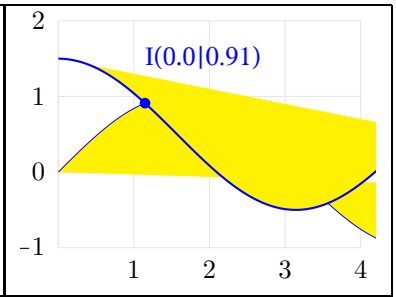
decimals=3,PrintCoord



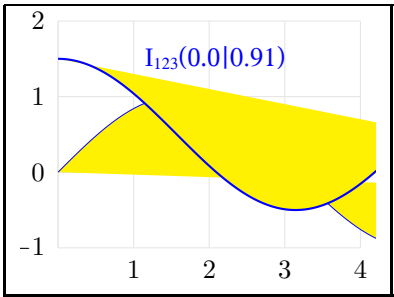
ydecimals=4,PrintCoord



xShift=.5,PrintCoord

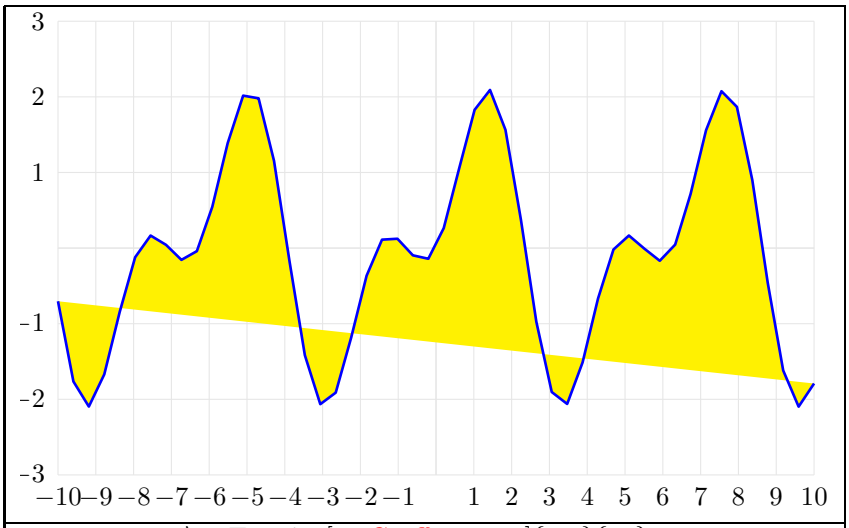


yShift=.5,PrintCoord



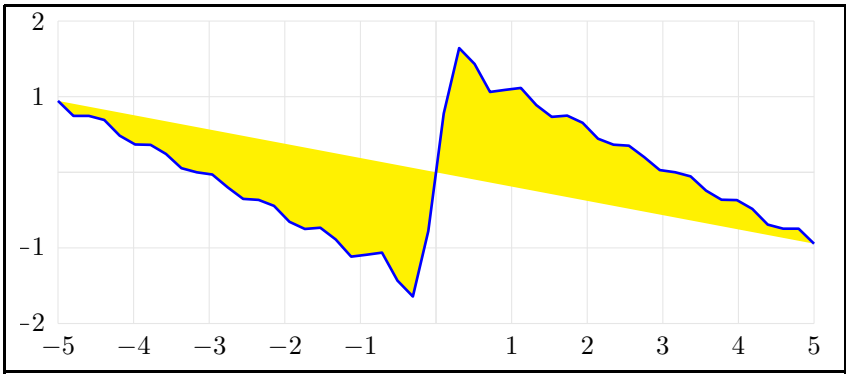
postString=123,PrintCoord

30.6 Fourrier



\psFourier[cosCoeff=0 1 -1]{-10}{10}

By default : cosCoeff =0

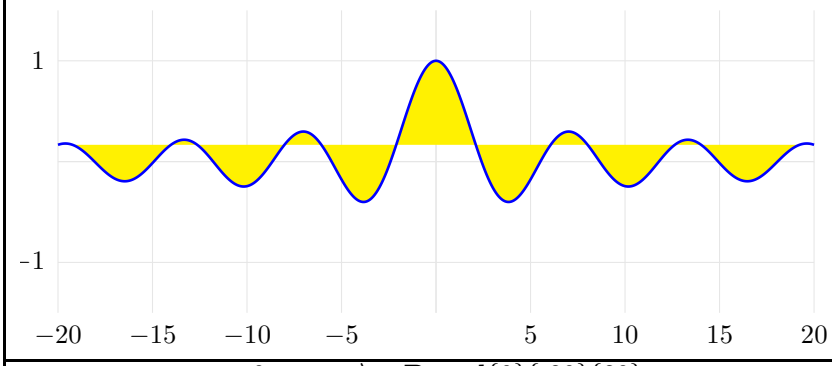


\psFourier[sinCoeff=1 .5 .33 .25 .2 .165 .14 .125]{-5}{5}

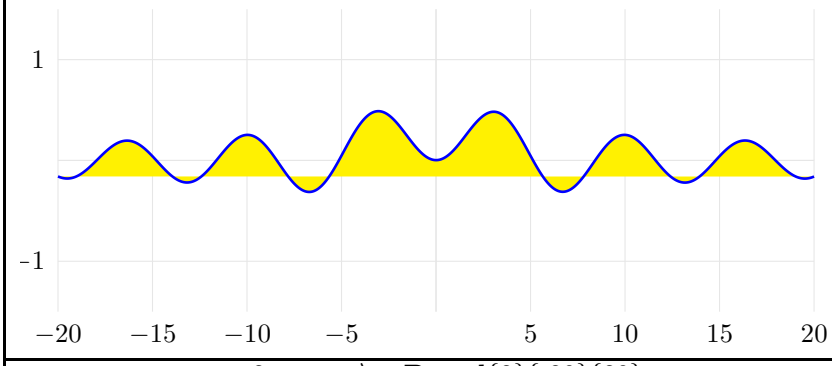
By default : sinCoeff =1

30.7 Bessel

$$J_n(x) = \frac{1}{\pi}\int_0^{\pi} \cos(x\sin t - nt)dt$$

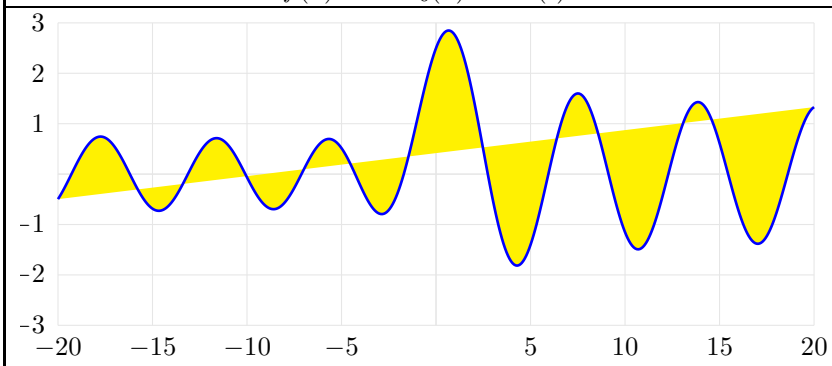


n= 0 \psBessel{0}{-20}{20}



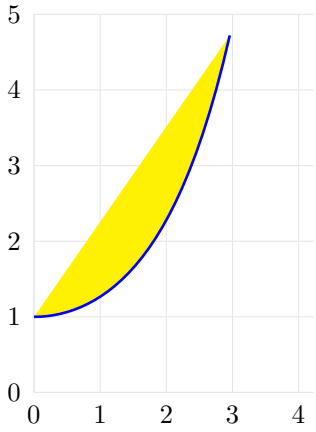
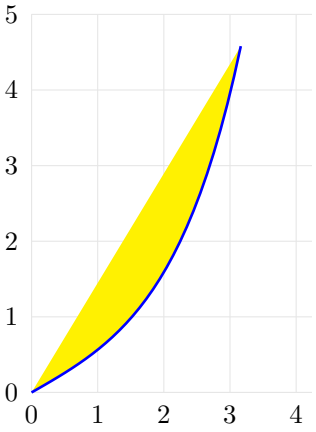
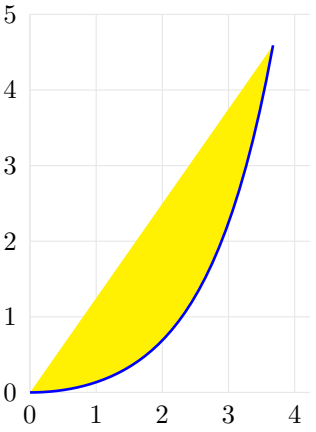
n= 2 \psBessel{2}{-20}{20}

$$f(x) = 2.5J_0(x) + sin(t)$$

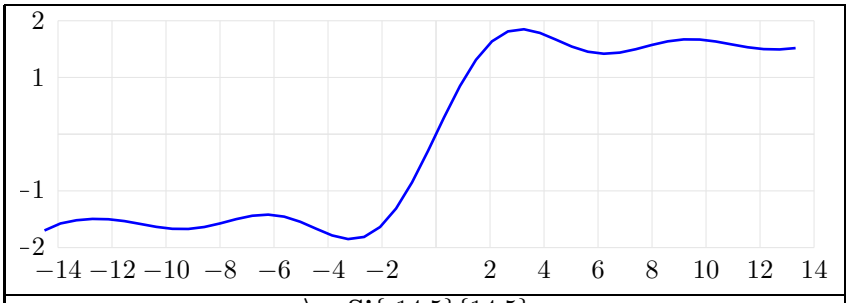


\psBessel[constI=2.5,constII={ t k sin }]{0}{-20}{20}

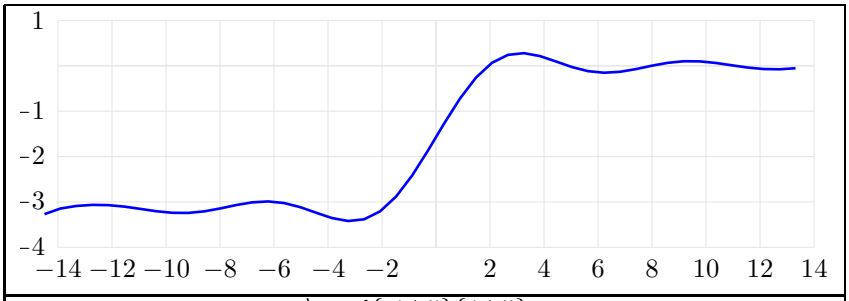
30.8 modified Bessel

\psModBessel[yMaxValue=5,nue=0]{0}{5}		
		
nue=0	nue=1	nue= 2
By default : nue=0		

30.9 Integral sinus

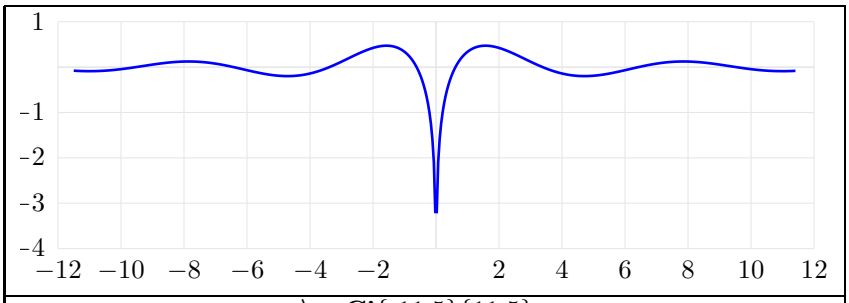


\psSi{-14.5}{14.5}

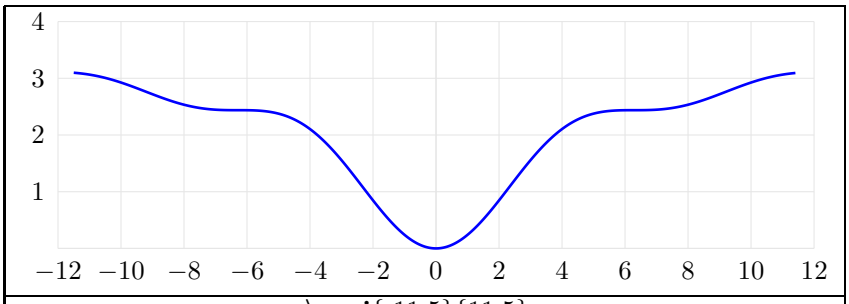


\pssi{-14.5}{14.5}

30.10 Integral cosinus

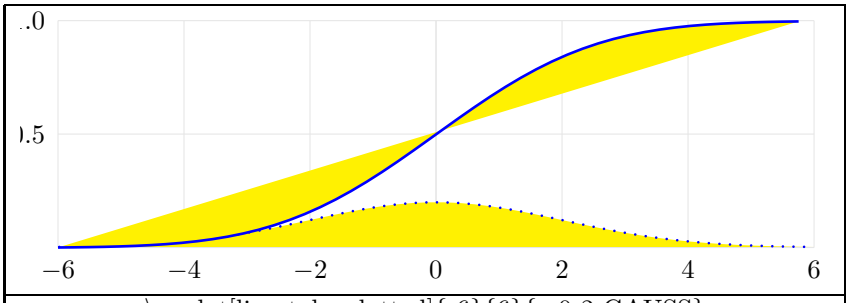


\psCi{-11.5}{11.5}

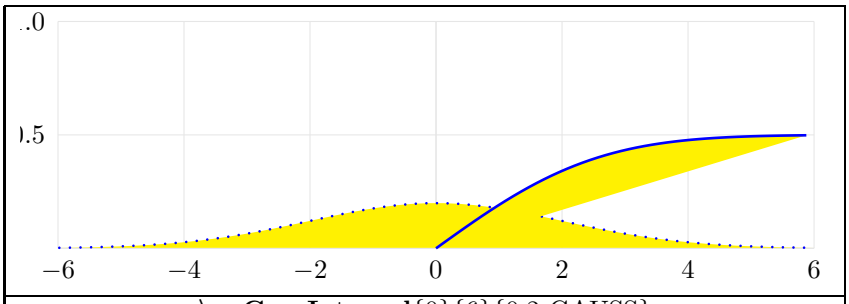


\psci{-11.5}{11.5}

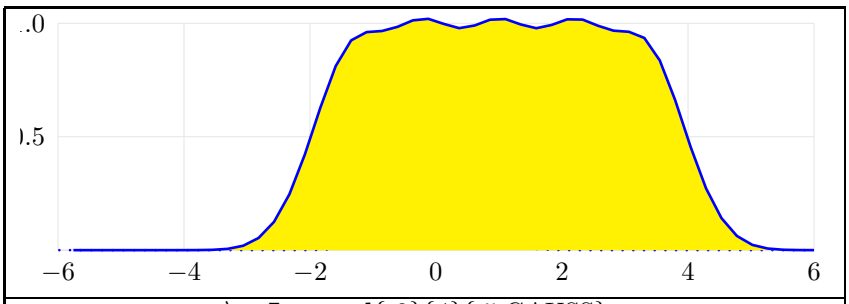
30.11 Integration and convolution



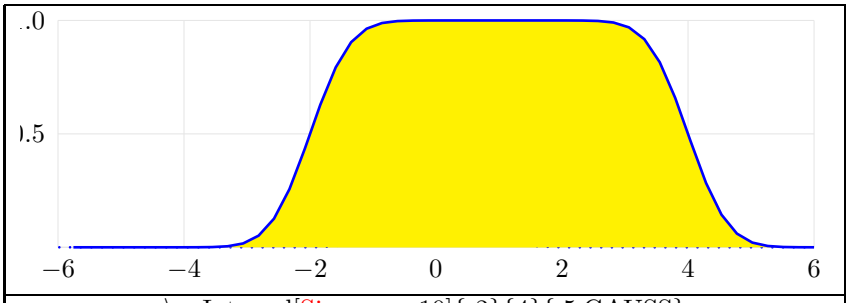
\psplot[linestyle=dotted]{-6}{6}{x 0 2 GAUSS}
\psCumIntegral{-10}{10}{0 2 GAUSS}



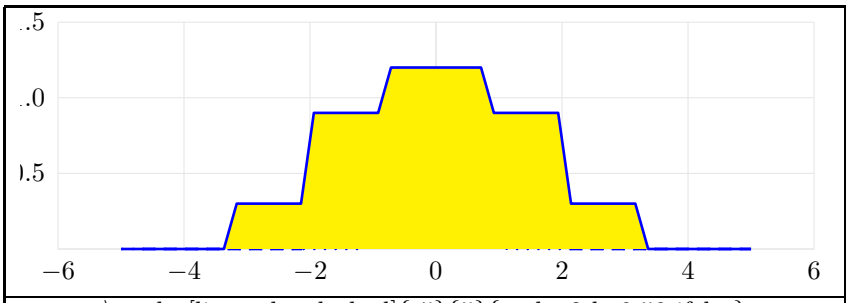
\psCumIntegral{0}{6}{0 2 GAUSS}



\psIntegral{-2}{4}{.5 GAUSS}

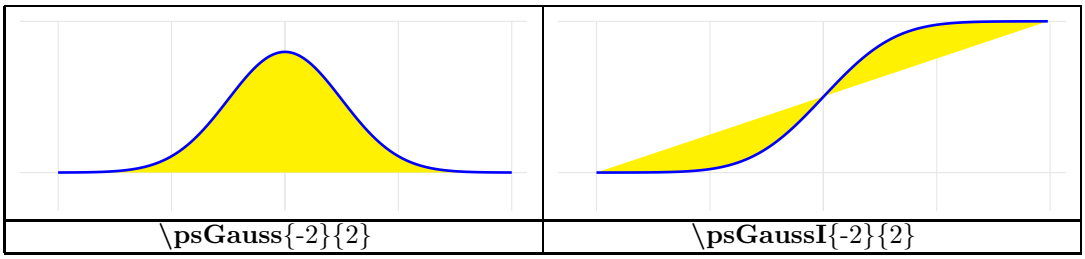


\psIntegral[Simpson=10]{-2}{4}{.5 GAUSS}



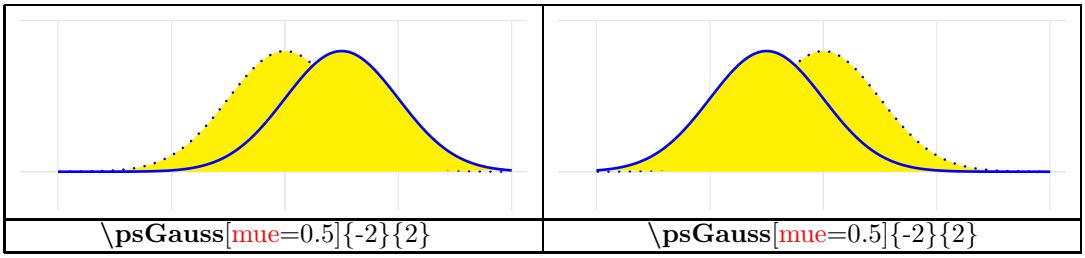

```
\psplot[linestyle=dashed]{-5}{5}{x abs 2 le 0.50 ifelse}
\psplot[linestyle=dotted]{-5}{5}{x abs 1 le 0.750 ifelse}
\psConv{-5}{5}{(}-6,6) {abs 2 le 0.50 ifelse}{abs 2 le 0.750 ifelse}
```

30.12 Gauss Distribution



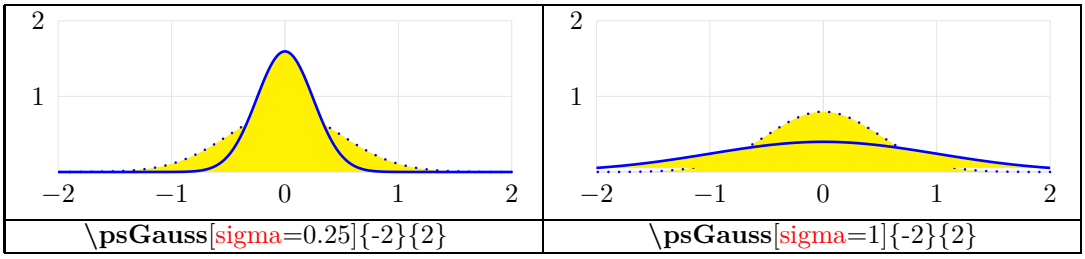
\psGauss{-2}{2}

\psGaussI{-2}{2}



\psGauss[mue=0.5]{-2}{2}

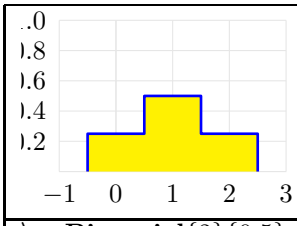
\psGauss[mue=0.5]{-2}{2}



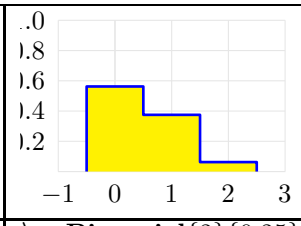
\psGauss[sigma=0.25]{-2}{2}

\psGauss[sigma=1]{-2}{2}

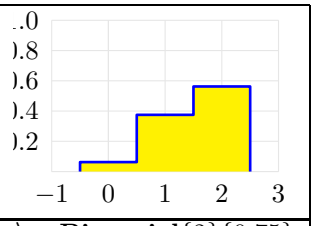
30.13 Binomial Distribution



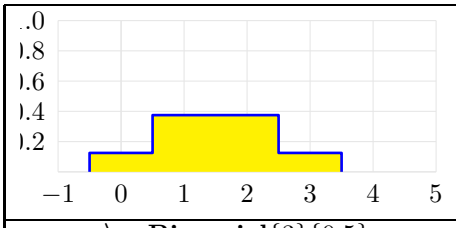
\psBinomial{2}{0.5}



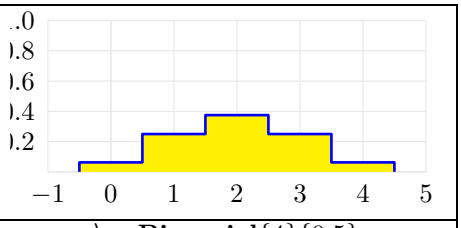
\psBinomial{2}{0.25}



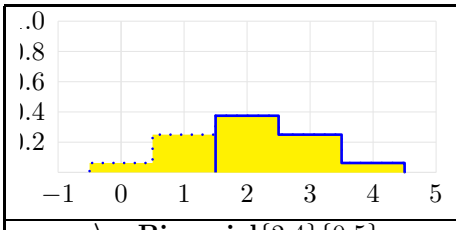
\psBinomial{2}{0.75}



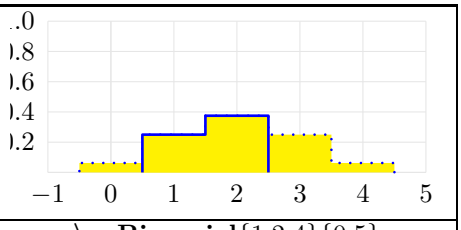
\psBinomial{3}{0.5}



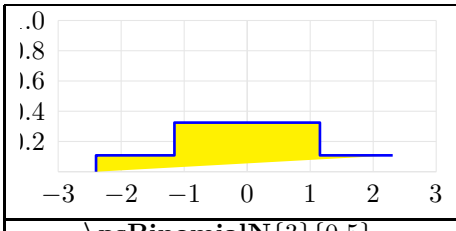
\psBinomial{4}{0.5}



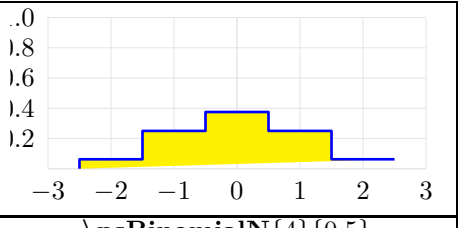
\psBinomial{2,4}{0.5}



\psBinomial{1,2,4}{0.5}

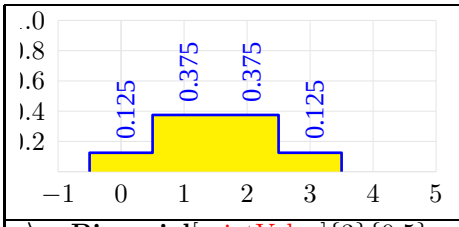


\psBinomialN{3}{0.5}

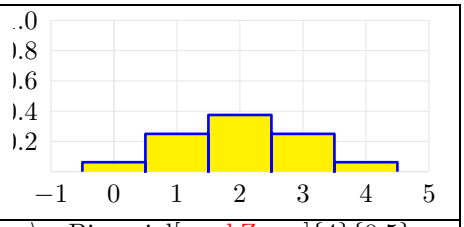


\psBinomialN{4}{0.5}

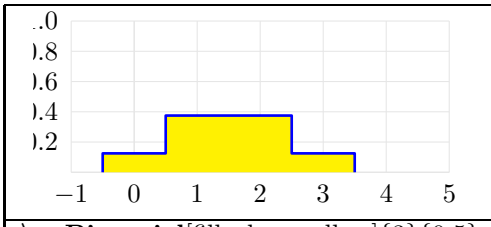
30.13.1 paramètres



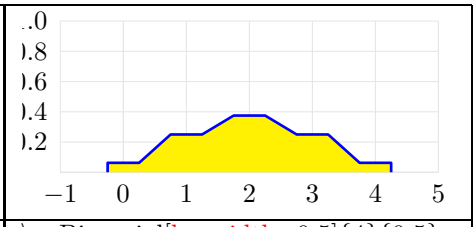
psBinomial[printValue]{3}{0.5}



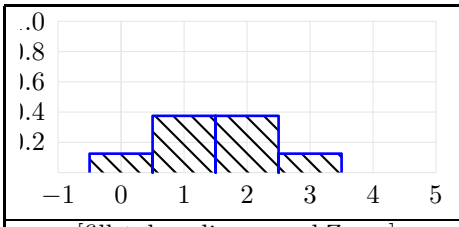
\psBinomial[markZeros]{4}{0.5}



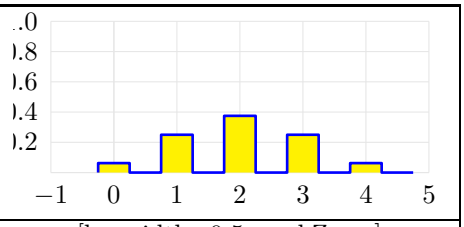
psBinomial[fillcolor=yellow]{3}{0.5}



\psBinomial[barwidth=0.5]{4}{0.5}

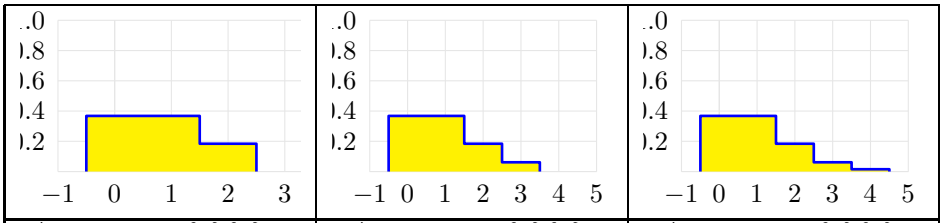


[fillstyle=vlines„markZeros]

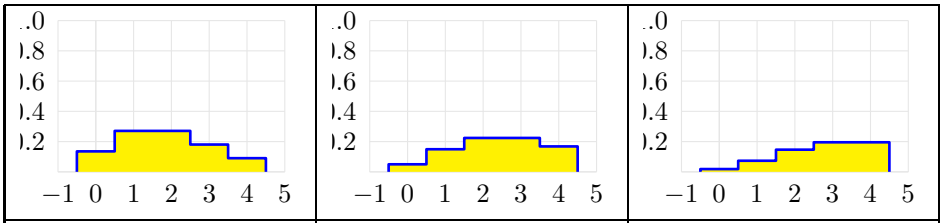


[barwidth=0.5,markZeros]

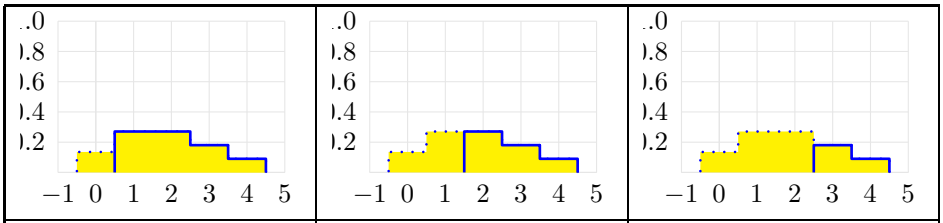
30.14 Poisson Distribution



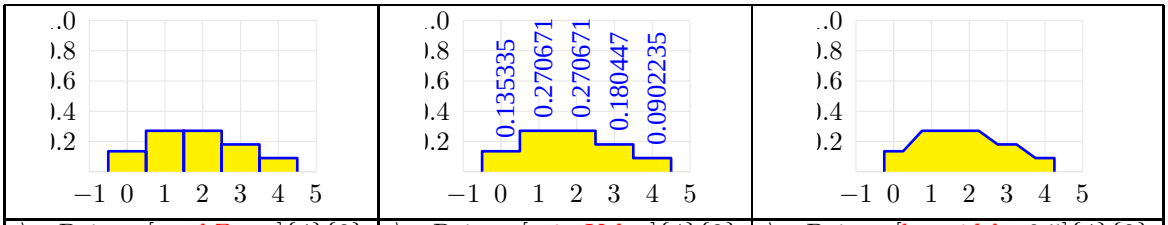
\psPoisson{2}{1}	\psPoisson{3}{1}	\psPoisson{4}{1}



\psPoisson{4}{2}	\psPoisson{4}{3}	\psPoisson{4}{4}

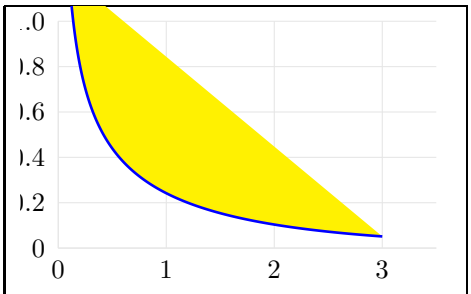


\psPoisson{1,4}{2}	\psPoisson{2,4}{2}	\psPoisson{3,4}{2}

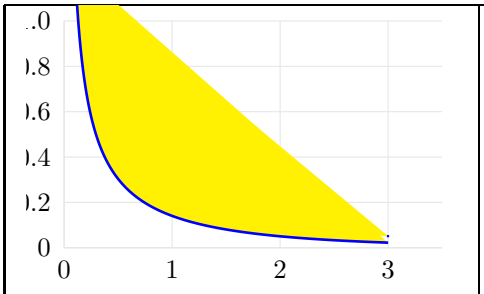


\psPoisson[markZeros]{4}{2}	\psPoisson[printValue]{4}{2}	\psPoisson[barwidth=0.5]{4}{2}

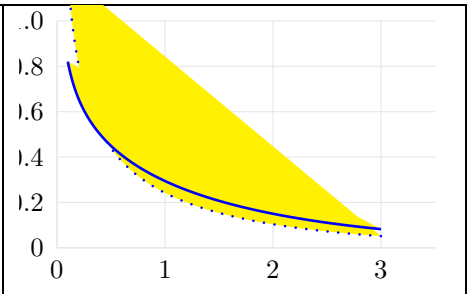
30.15 Gamma Distribution



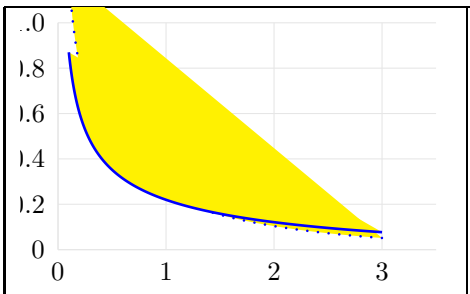
\psGammaDist{0.1}{3}



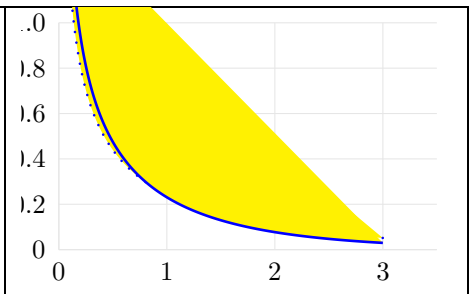
\psGammaDist[alpha=0.25]{0.1}{3}



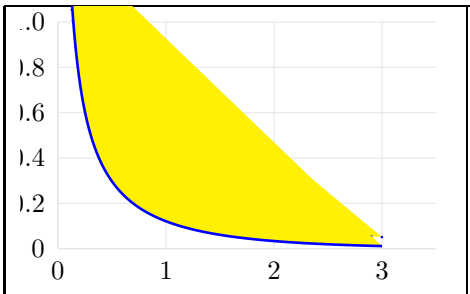
\psGammaDist[alpha=0.75]{0.1}{3}



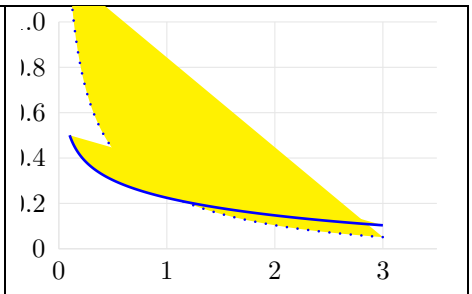
\psGammaDist[beta=0.25]{0.1}{3}



\psGammaDist[beta=0.75]{0.1}{3}

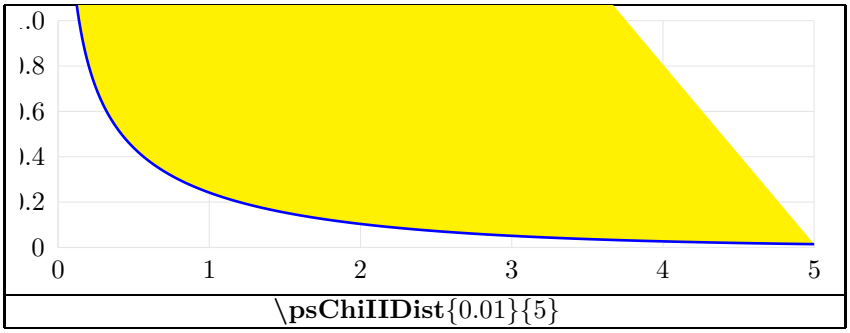


[alpha=0.25,beta=0.75]

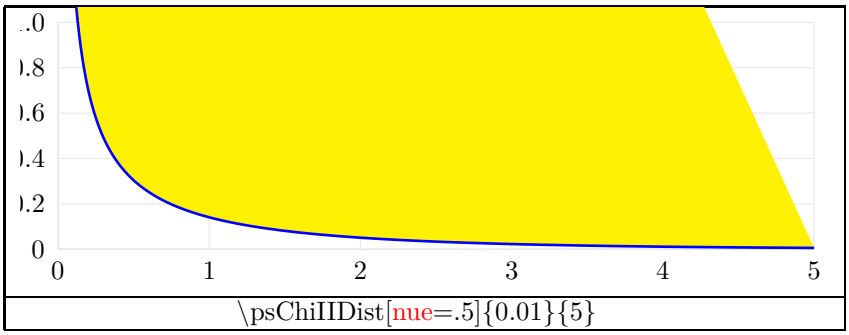


[alpha=0.75,beta=0.25]

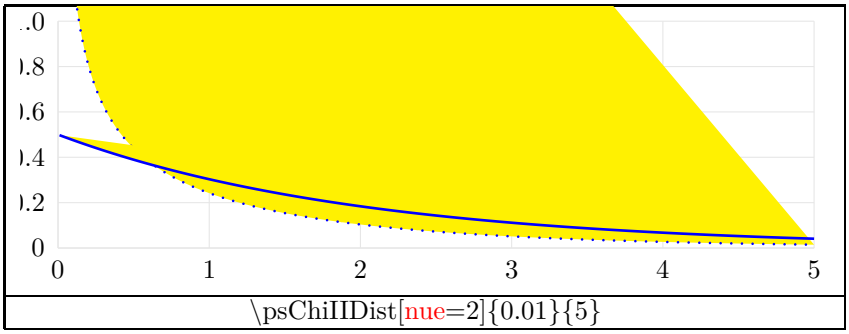
30.16 χ^2 Distribution



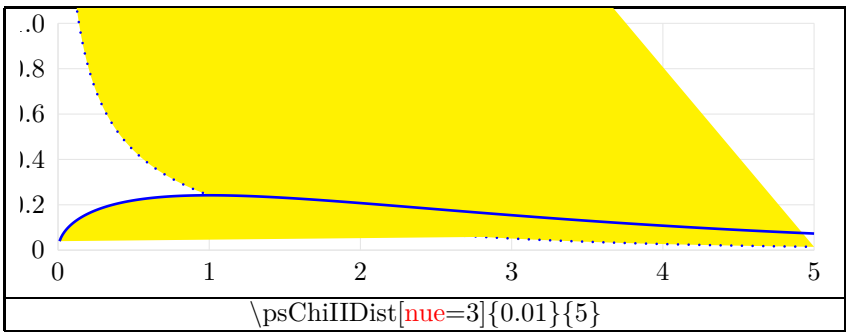
psChiIIDist{0.01}{5}



\psChiIIDist[nue=.5]{0.01}{5}

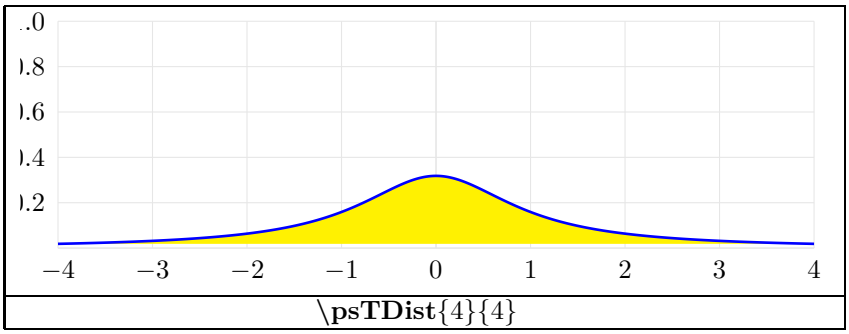


\psChiIIDist[nue=2]{0.01}{5}

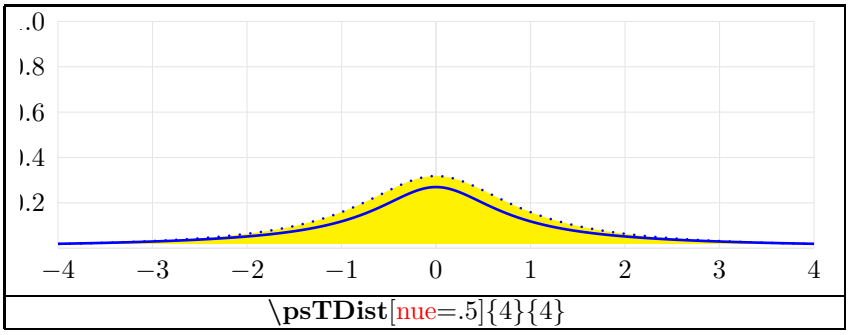


\psChiIIDist[nue=3]{0.01}{5}

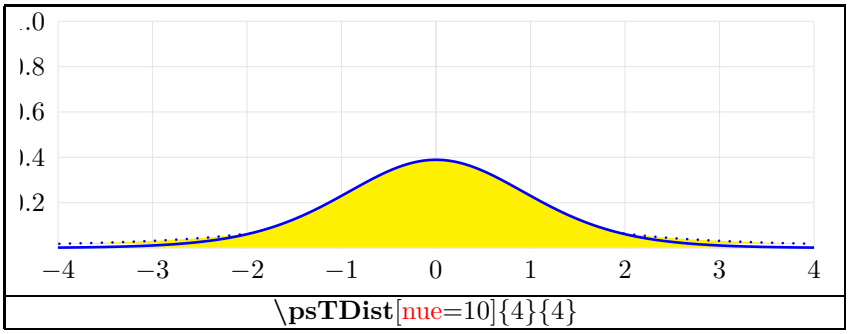
30.17 Student Distribution



\psTDist{4}{4}

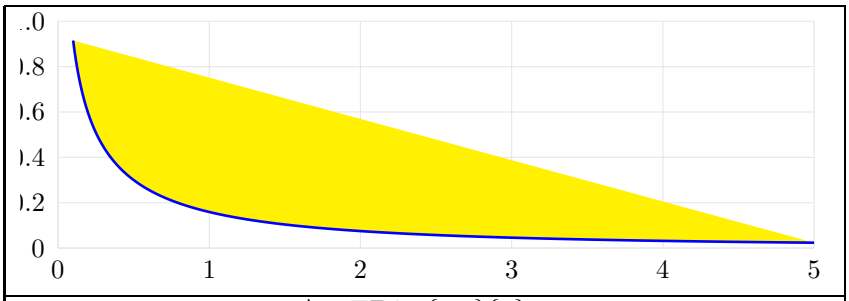


\psTDist[nue=.5]{4}{4}

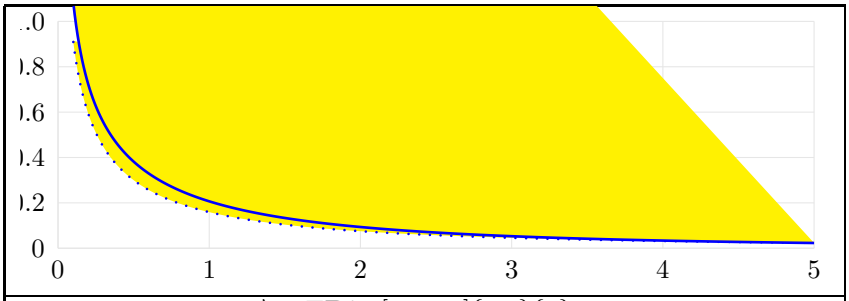


\psTDist[nue=10]{4}{4}

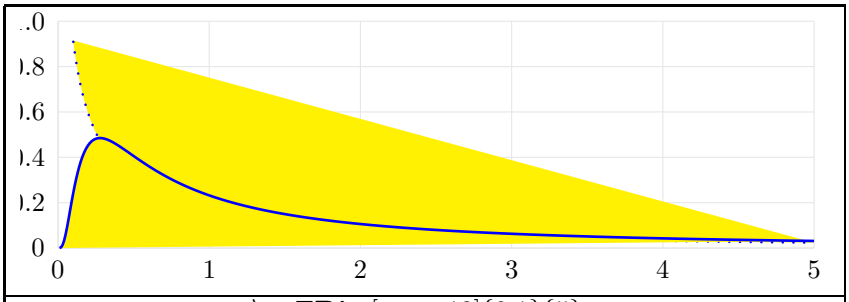
30.18 F Distribution



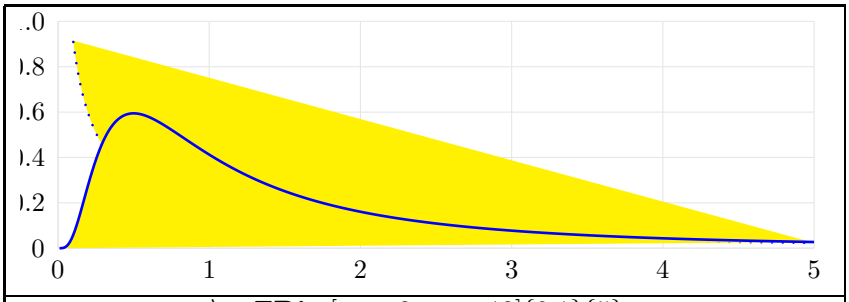
\psFDist{0.1}{5}



\psFDist[nue=3]{0.1}{5}

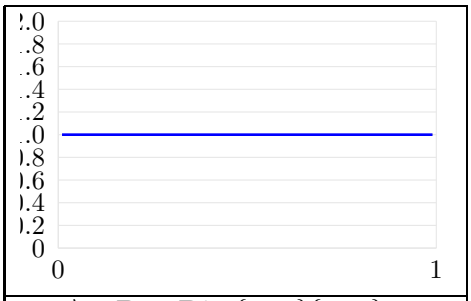


\psFDist[mue=12]{0.1}{5}



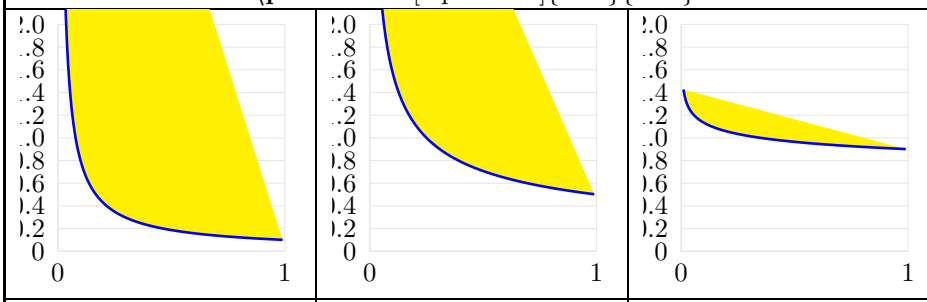
\psFDist[nue=3,mue=12]{0.1}{5}

30.19 Beta Distribution



psBetaDist{0.01}{0.99}

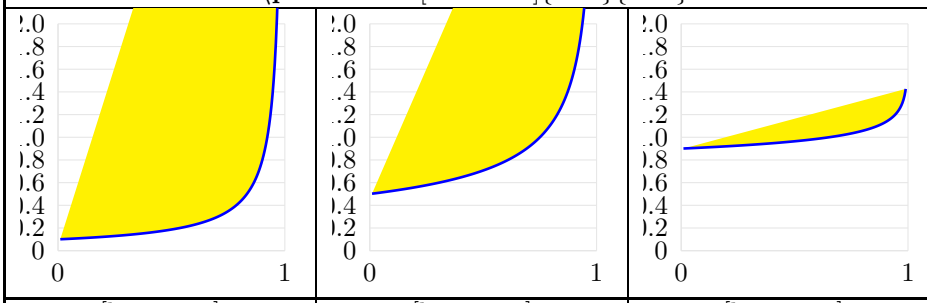
psBetaDist[alpha=0.1]{0.01}{0.99}



[alpha=0.1] | [alpha=0.5] | [alpha=0.9]

By default : alpha= 1

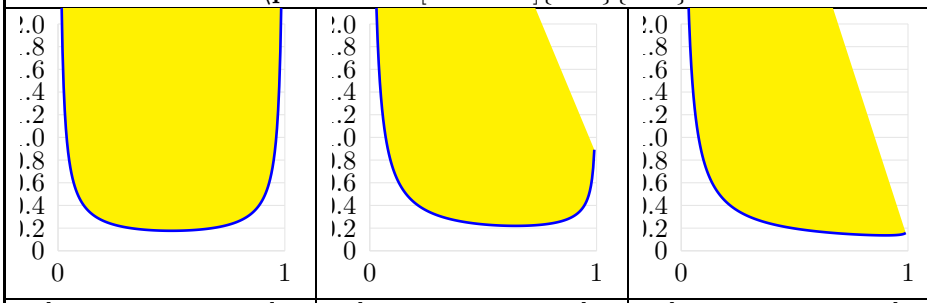
psBetaDist[beta=0.1]{0.01}{0.99}



[beta=0.1] | [beta=0.5] | [beta=0.9]

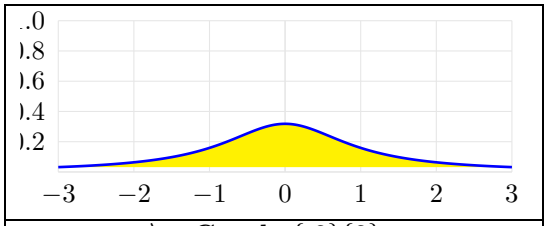
By default : beta= 1

psBetaDist[beta=0.1]{0.01}{0.99}



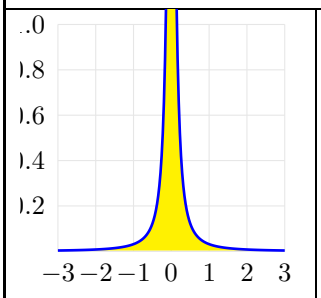
[alpha=.1,beta=0.1] | [alpha=.1,beta=0.5] | [alpha=.1,beta=0.9]

30.20 Cauchy Distribution

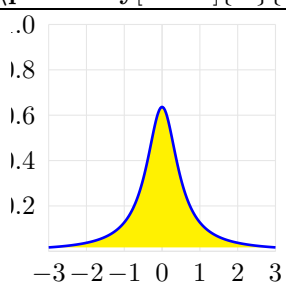


psCauchy{-3}{3}

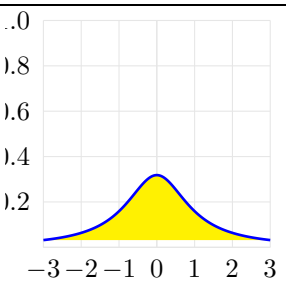
psCauchy[b=0.1]{-3}{3}



[b=0.1]]



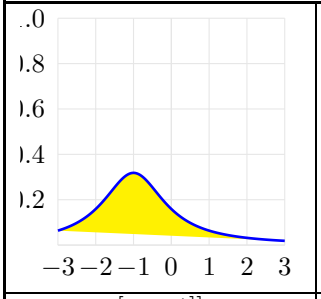
[b=0.5]



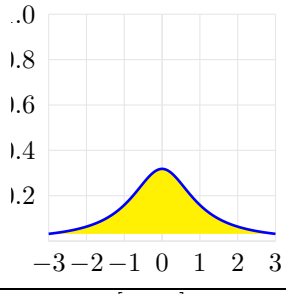
[b=1]

By default : b = 1

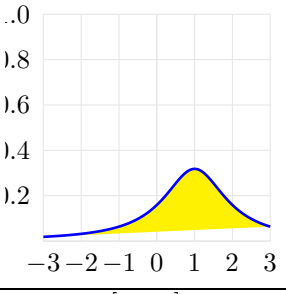
psCauchy[m=0.1]{-3}{3}



[m=-1]]

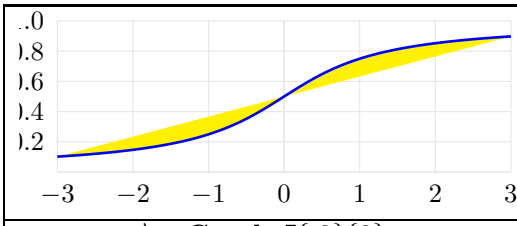


[m=0]



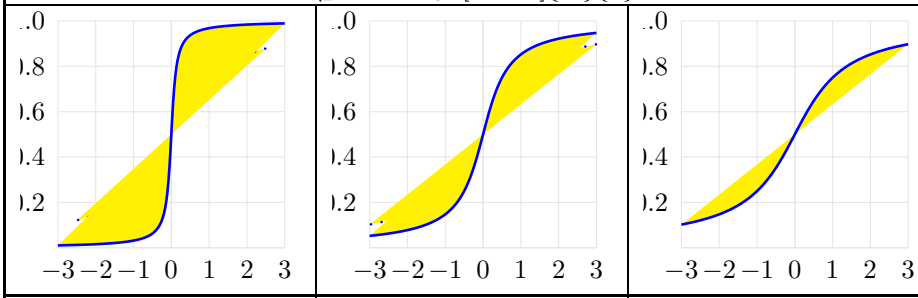
[m=1]

By default : m = 0



psCauchyI{-3}{3}

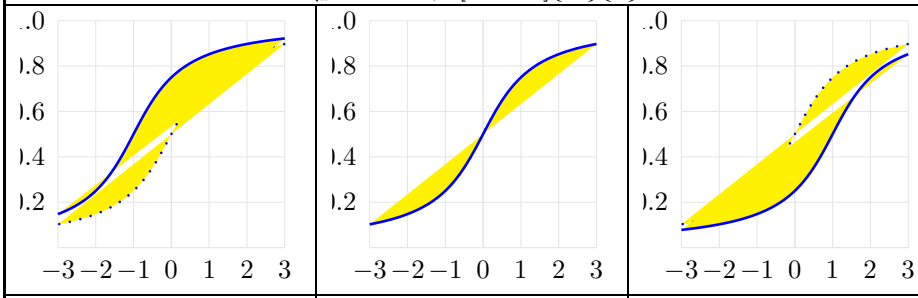
psCauchyI[b=0.1]{-3}{3}



[b=0.1]] | [b=0.5] | [b=1]

By default : b = 1

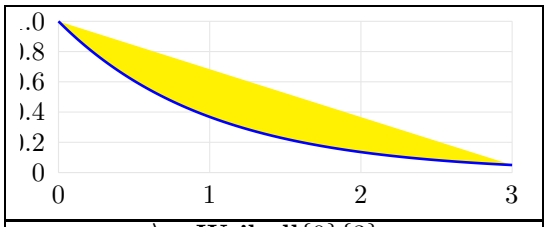
psCauchyI[m=0.1]{-3}{3}



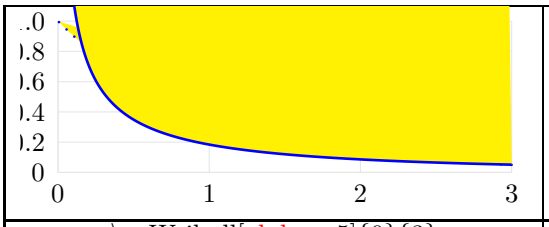
[m=-1] | [m=0] | [m=1]

By default : m = 0

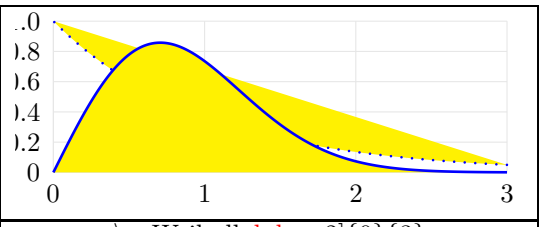
30.21 Weibull Distribution



\psWeibull{0}{3}

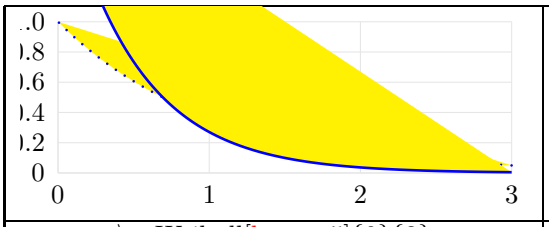


\psWeibull[alpha=.5]{0}{3}

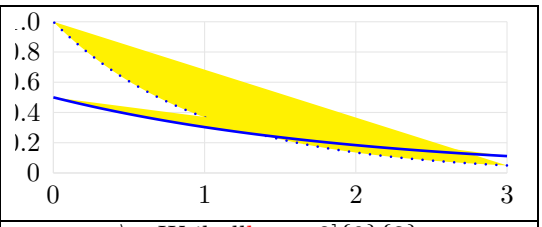


\psWeibullalpha=2]{0}{3}

By default : alpha=1

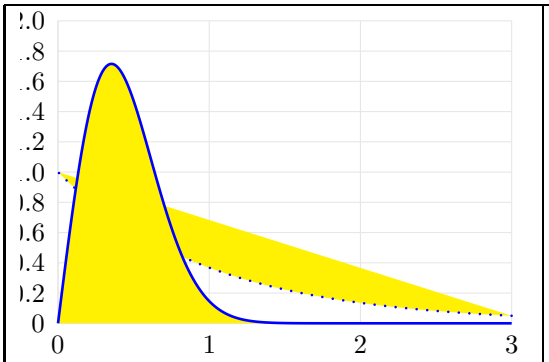


\psWeibull[beta=.5]{0}{3}

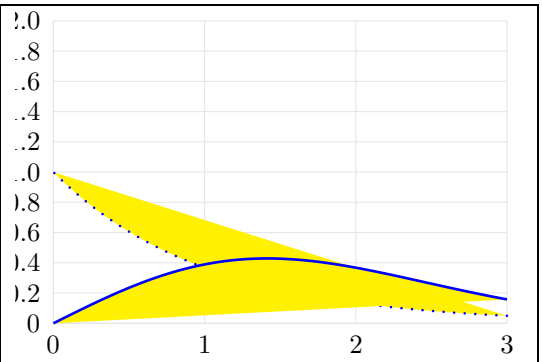


\psWeibullbeta=2]{0}{3}

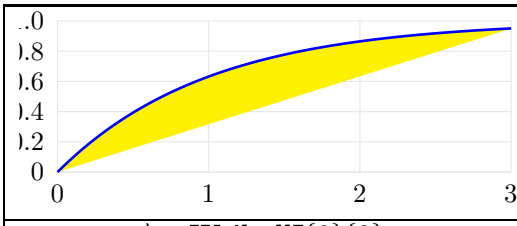
By default :beta=1



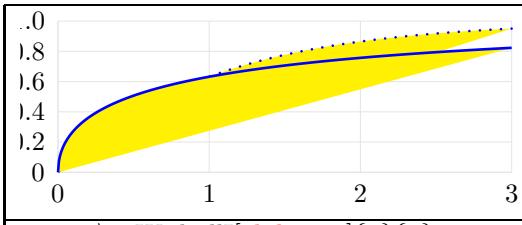
\psWeibull[alpha=2,beta=.5]{0}{3}



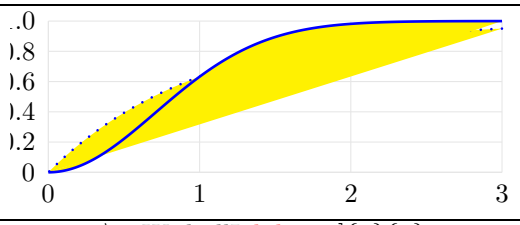
\psWeibull[alpha=2,beta=2]{0}{3}



\psWeibullI{0}{3}

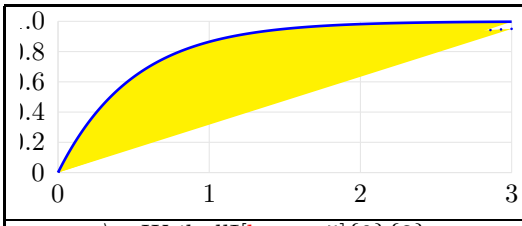


\psWeibullI[alpha=.5]{0}{3}

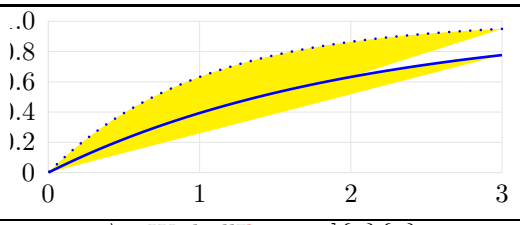


\psWeibullIalpha=2]{0}{3}

By default : alpha=1

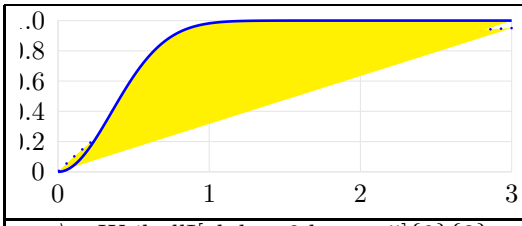


\psWeibullI[beta=.5]{0}{3}

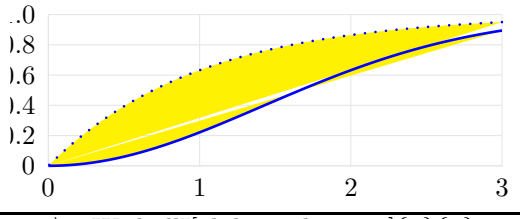


\psWeibullIbeta=2]{0}{3}

By default : beta=1

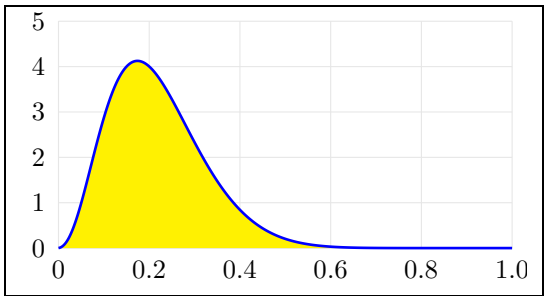


\psWeibullI[alpha=2,beta=.5]{0}{3}

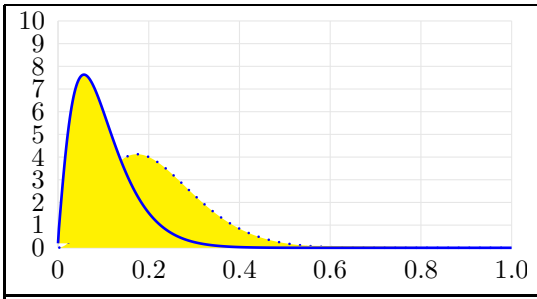


\psWeibullI[alpha=2,beta=2]{0}{3}

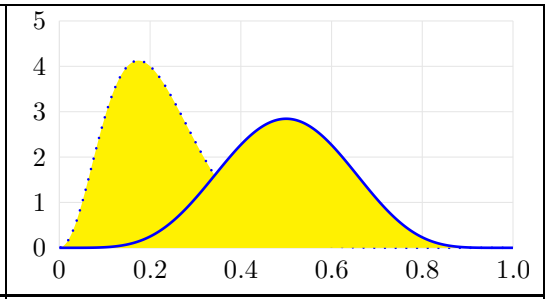
30.22 Vasicek Distribution



\psVasicek{0}{3}

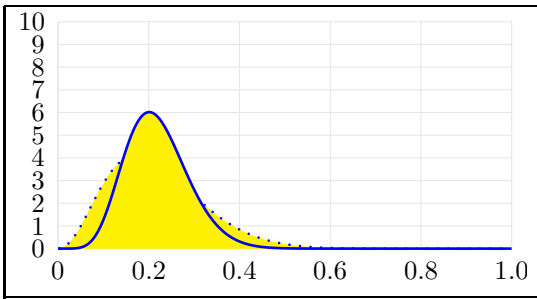


\psVasicek[pd=.1]{0}{3}

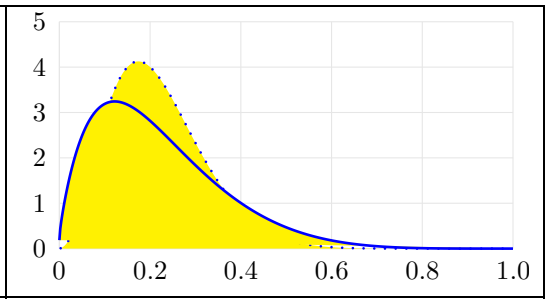


\psVasicek[pd=.5]{0}{3}

By default : pd = 0.22

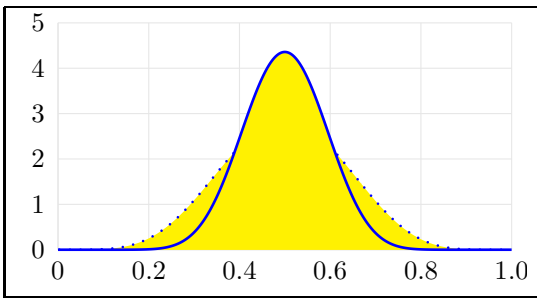


\psVasicek[R2=.05]{0}{3}

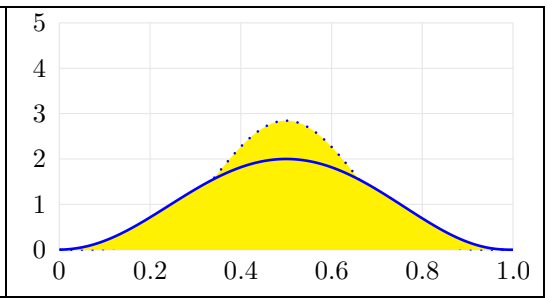


\psVasicek[R2=.2]{0}{3}

By default : R2 = 0.11

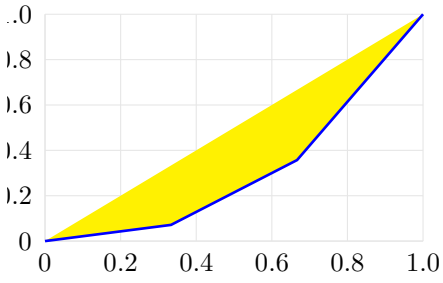


\psVasicek[pd=.5,R2=.05]{0}{3}

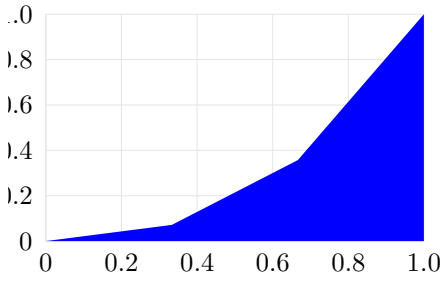


\psVasicek[pd=.5,R2=.2]{0}{3}

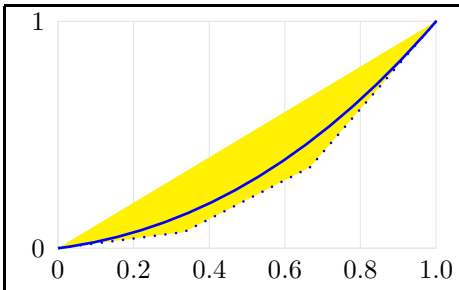
30.23 Lorenz curve



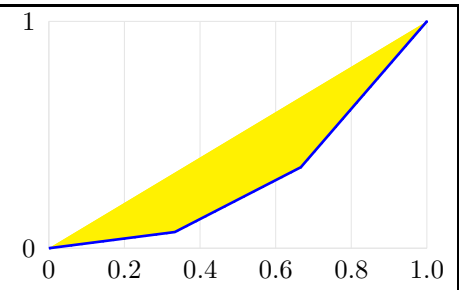
\psLorenz{0.1 0.2 0.3}



\psLorenz*{0.1 0.2 0.3 }

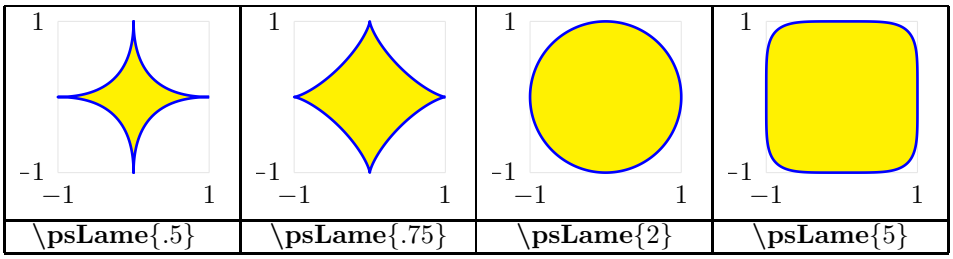


\psLorenz[plotstyle=bezier]{.1 .2 .3}

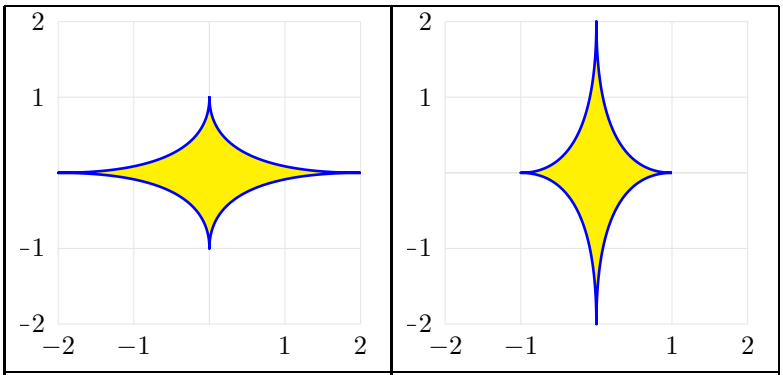


\psLorenz[Gini]{.1 .2 .3 }

30.24 Lame curve

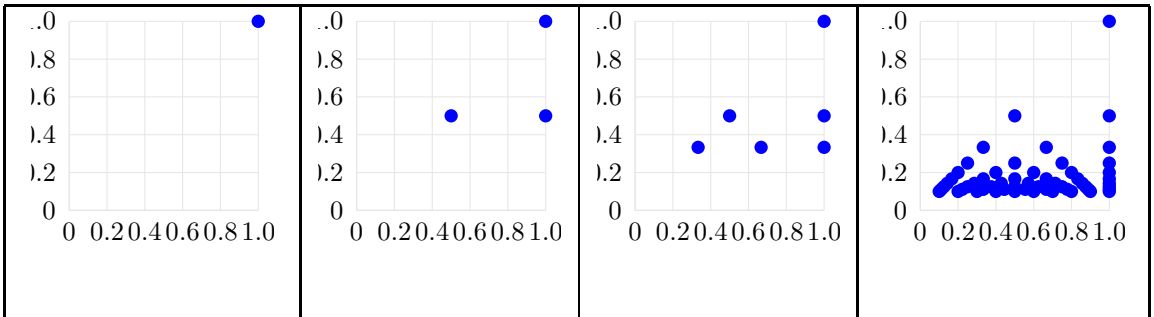


\psLame{.5}	\psLame{.75}	\psLame{2}	\psLame{5}

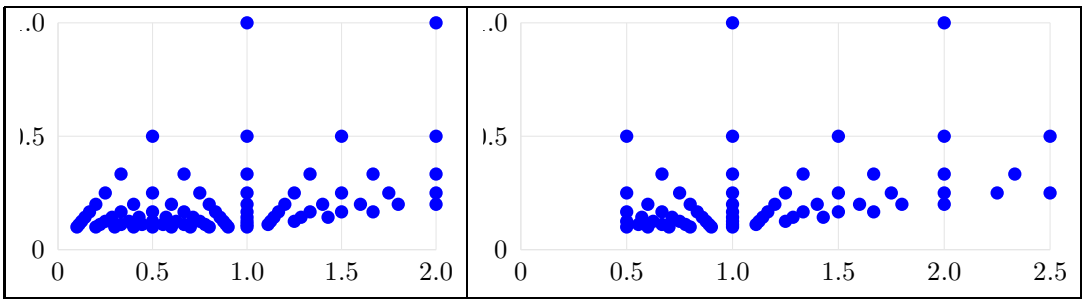


\psLame[radiusA=2]{.5}	\psLame[radiusB=2]{.5}

30.25 Thomae curve

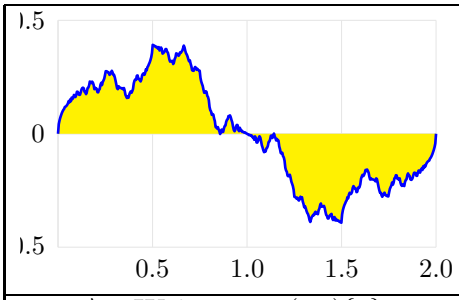


\psThomae(0,1){1}	\psThomae(0,1){2}	\psThomae(0,1){3}	\psThomae(0,1){10}

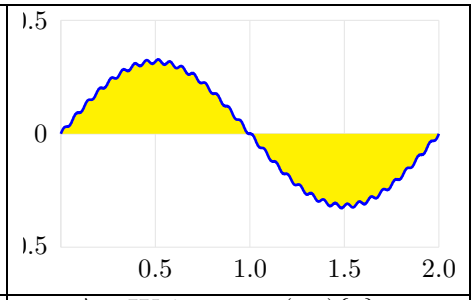


\psThomae(0,2)10(0,2){10}	\psThomae(0,2)10(0.5,2){10}

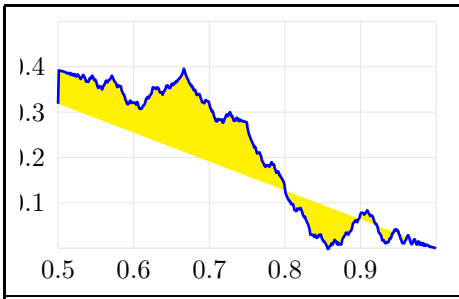
30.26 Weierstrass curve



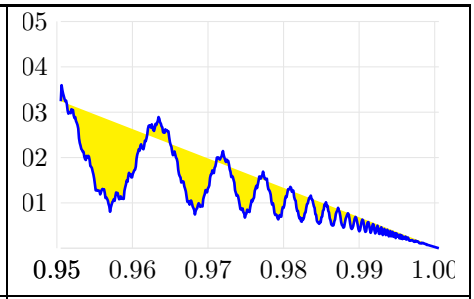
\psWeierstrass(0,2){2}



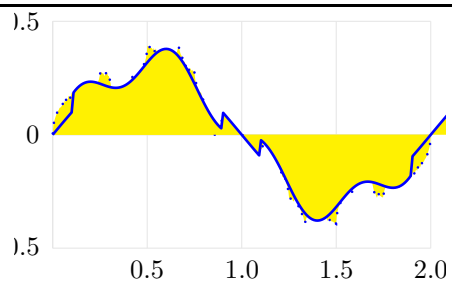
\psWeierstrass(0,2){5}



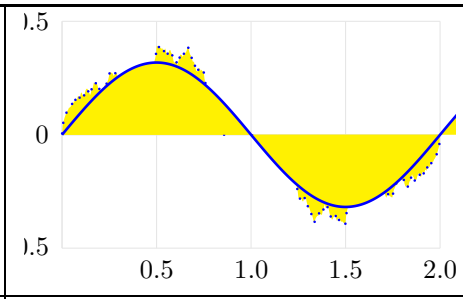
\psWeierstrass(.5,1){2}



\psWeierstrass(.95,1){5}



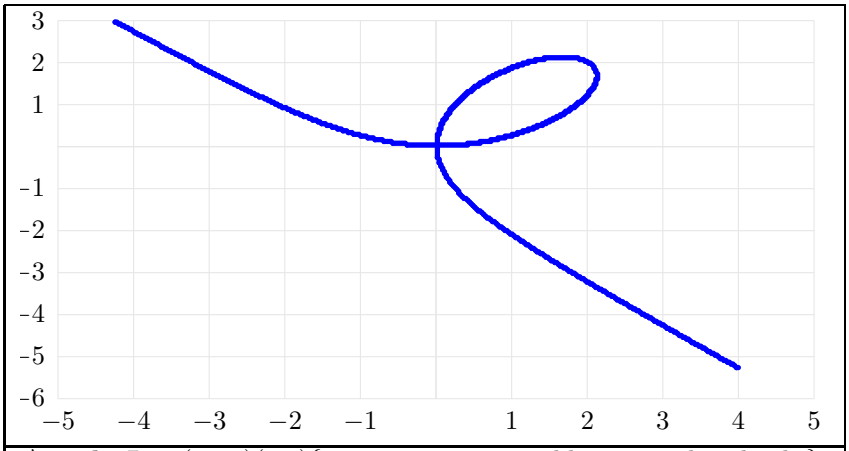
\psWeierstrass[epsilon=1.e-1](0,5){2}



\psWeierstrass[epsilon=1](0,5){2}

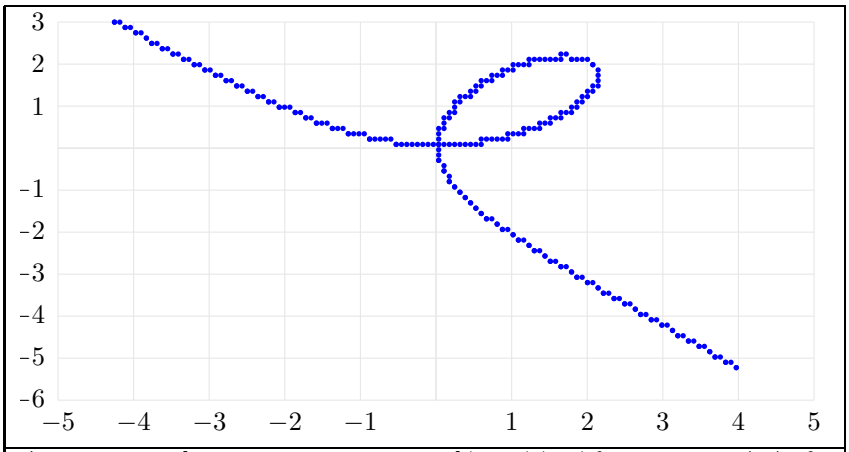
By default : epsilon=1.e-18

30.27 implicit defined functions

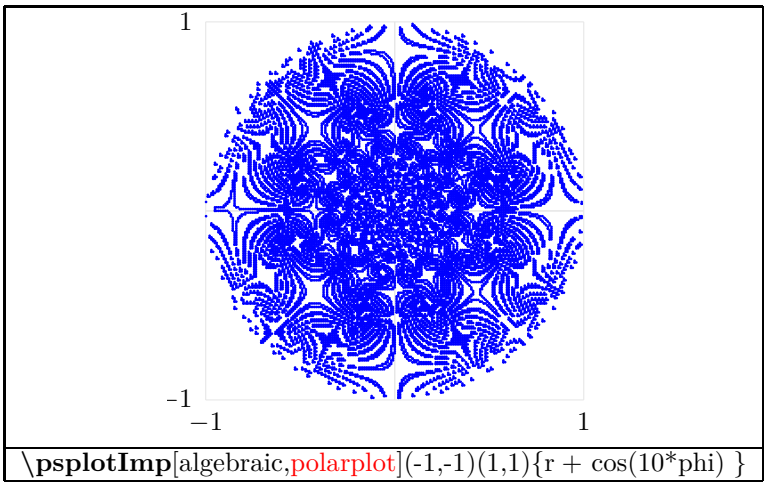


\psplotImp(-6,-7)(4,3){4 x 3 exp y 3 exp add 4 x y mul mul sub }

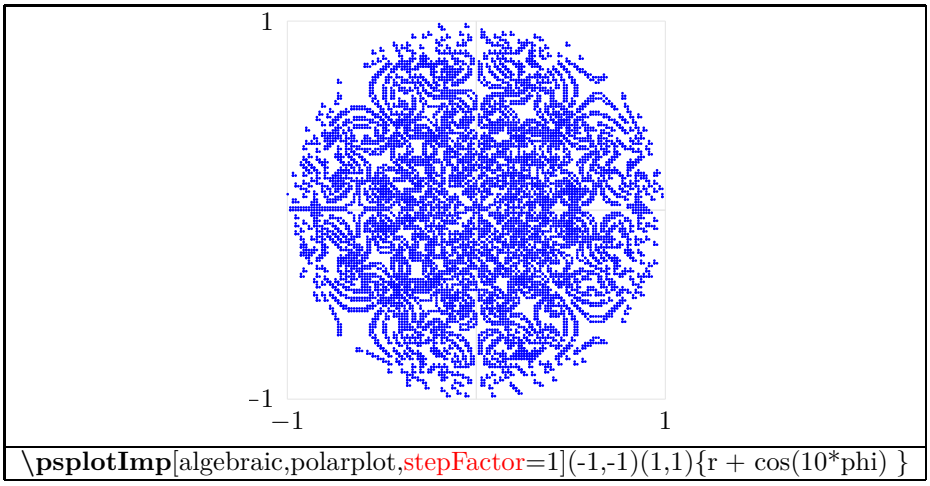
\psplotImp[algebraic](-6,-7)(4,3){x^3 +y^3 -4*x*y }



\psplotImp[algebraic,stepFactor=2](-6,-7)(4,3){x^3 +y^3 -4*x*y }

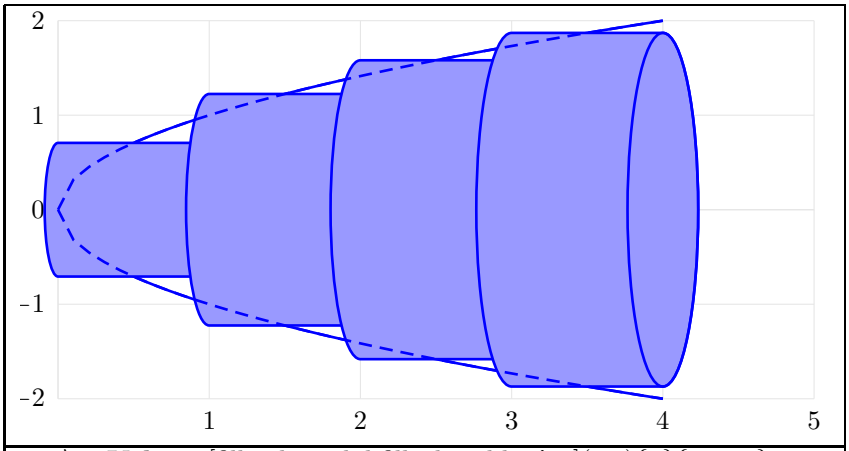


psplotImp[algebraic,polarplot](-1,-1)(1,1){r + cos(10*phi) }

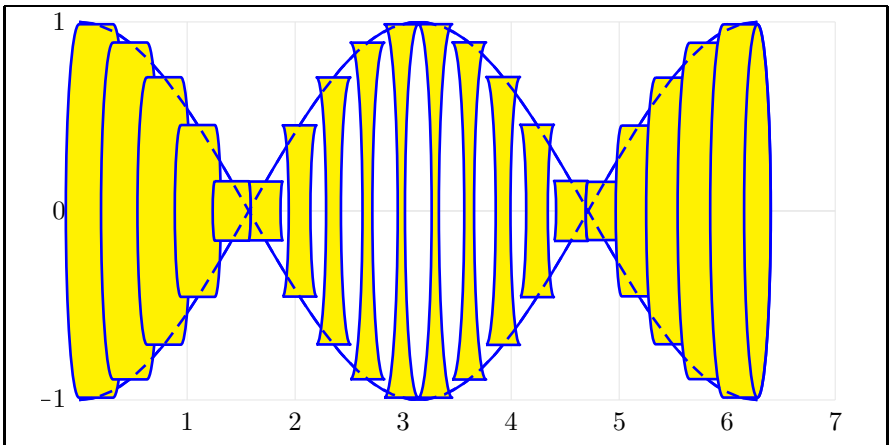


psplotImp[algebraic,polarplot,stepFactor=1](-1,-1)(1,1){r + cos(10*phi) }

30.28 Rotating functions



\psVolume[fillstyle=solid,fillcolor=blue!40](0,4){4}{x sqrt}

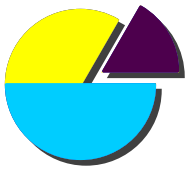


\psVolume[fillstyle=solid,fillcolor=yellow,algebraic](0,6.28){20}{cos(x)}

31 Pie chart

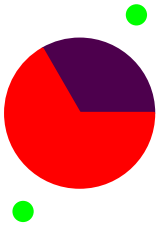
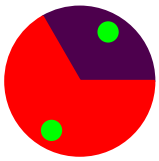
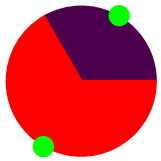
Syntax : \psChart[options]value list list shifted values radius

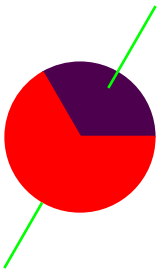
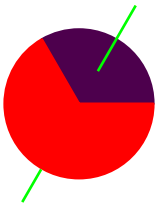
	
psChart{1,2,3,4,5}{}{1cm}	**psChart**{1,2,3,4,5}{2,5}{1cm}

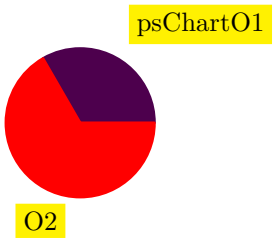
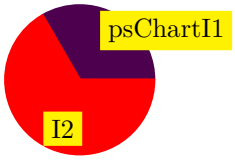
		
chartColor=color	userColor={orange,teal,red!20}	shadow=true

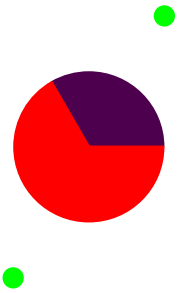
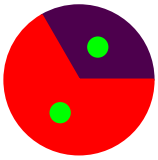
		
chartSep=5pt par défaut : 10pt		

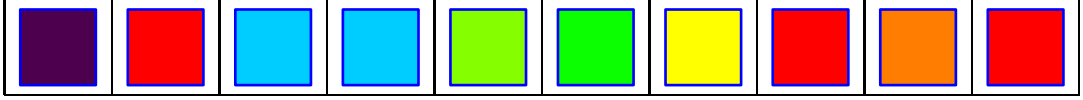
31.1 Labels

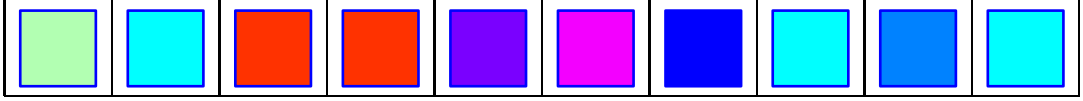
Three possible positions		
		
\psdots(psChartO1) \psdots(psChartO2)	\psdots(psChartI1) \psdots(psChartI2)	\psdots(psChart1) \psdots(psChart2)

Connection of the points	
	
\pcline(psChartO1)(psChartI1) \pcline(psChartO2)(psChart2)	\ncline{psChartO1}{psChartI1} \ncline{psChartO2}{psChart2}

labels attachment points	
	
\rput*[l](psChartO1){psChartO1} \rput*[l](psChartO2){O2}	\rput*[l](psChartI1){psChartI1} \rput*[l](psChartI2){I2}

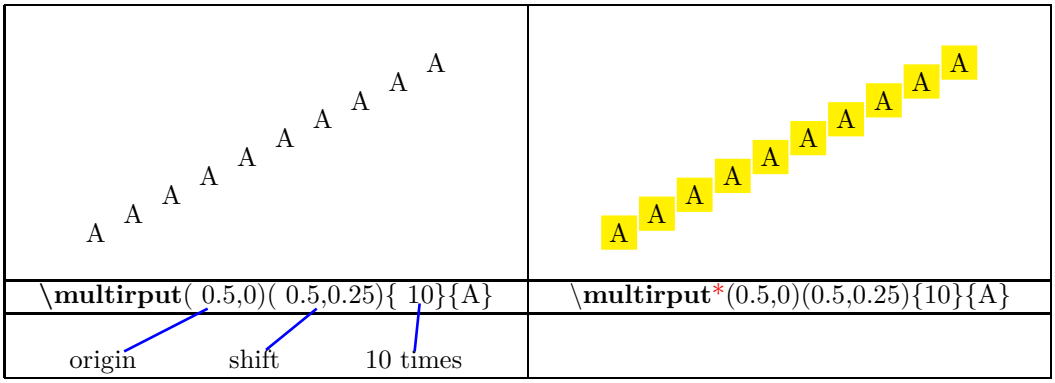
	
chartNodeO=2 par défaut : 1.5	chartNodeI=.5 par défaut : .75

Filling color \psframe[fillcolor=chartFillColor1(1,1) à \psframe[fillcolor=chartFillColor10(1,1)


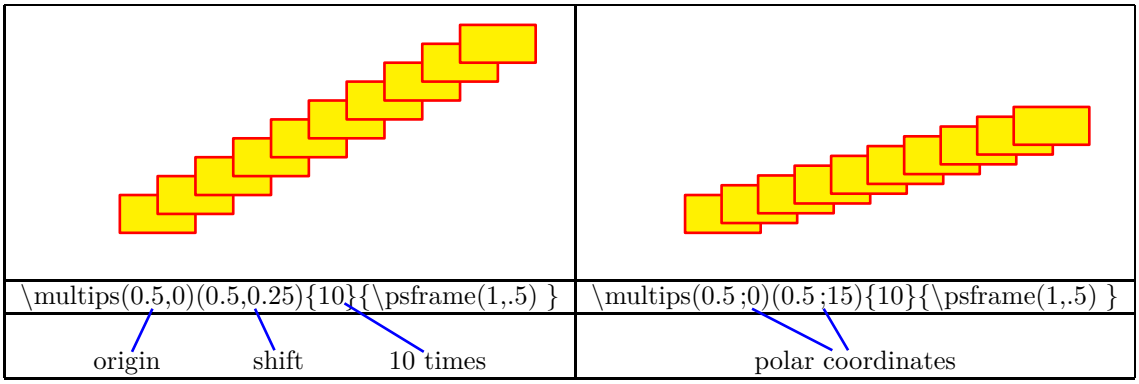
More colors \psframe[fillcolor=-chartFillColor1(1,1) à \psframe[fillcolor=-chartFillColor10(1,1)


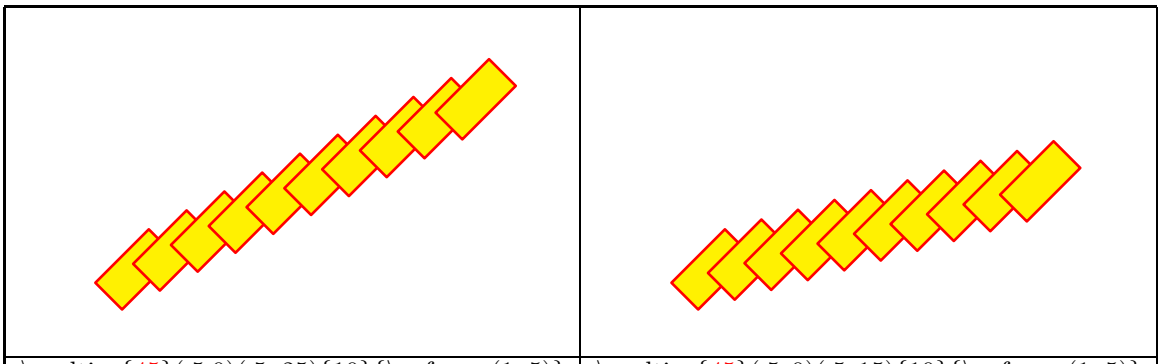
32 Repetitions

32.1 Multirput [1]



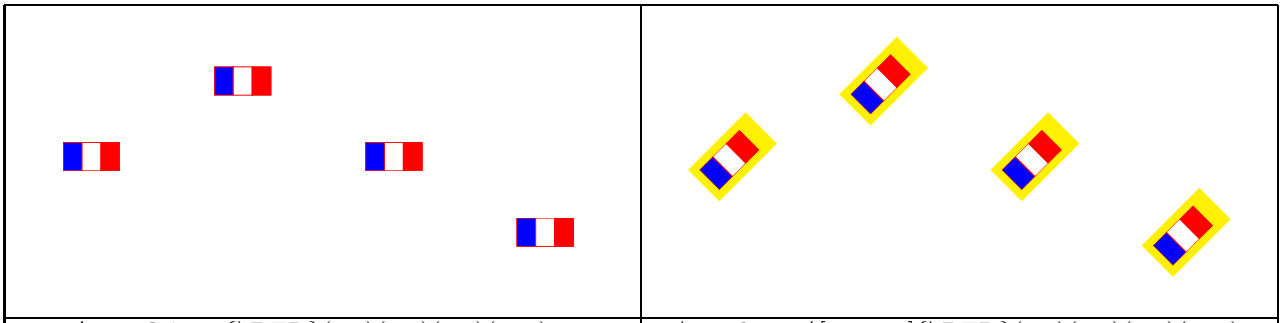
32.2 multips [1]





\multips{45}(.5,0)(.5,.25){10}{\psframe(1,.5)} | \multips{45}(.5 ;0)(.5 ;15){10}{\psframe(1,.5)}

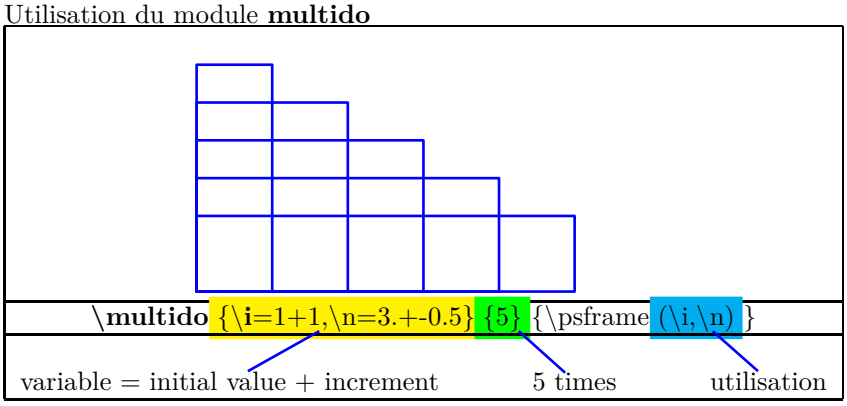
32.3 rmultiput [2]



\rmultiput{\DFR}(0,0)(2,1)(4,0)(6,-1) | \rmultiput*[rot=45]{\DFR}(0,0)(2,1)(4,0)(6,-1)

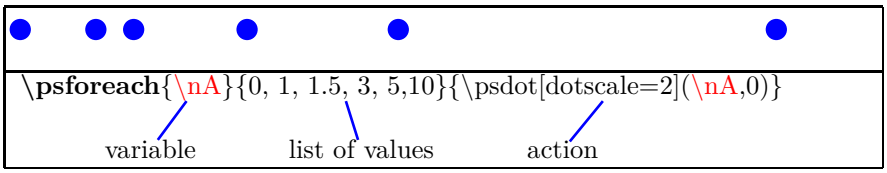
32.4 Multido [1] [24]

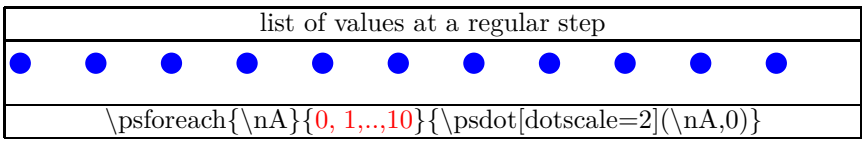
Utilisation du module **multido**

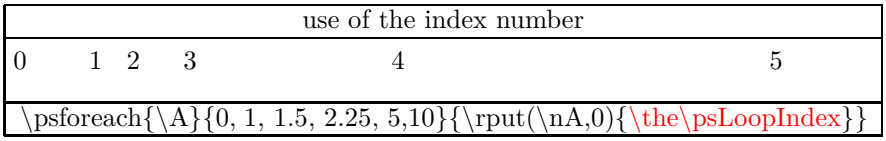


variables types	
initial	dimension
d ou D	lenght
i ou I	integer
n ou N	real
r ou R	real

32.5 Commande psforeach [15]





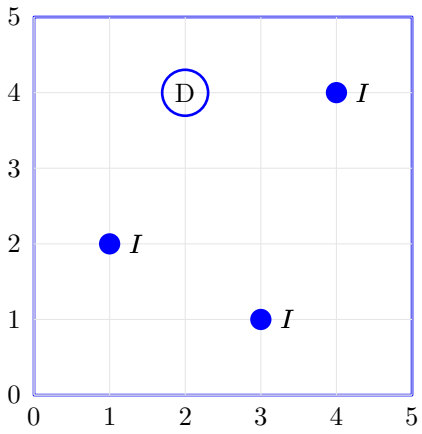
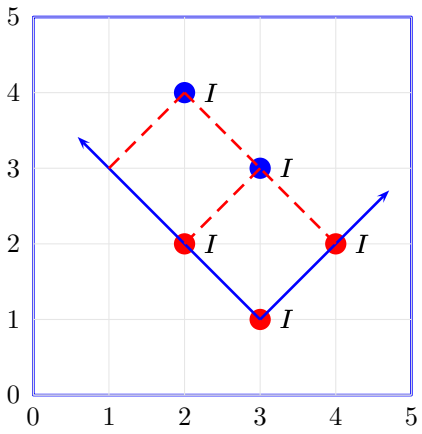


33 Geometry

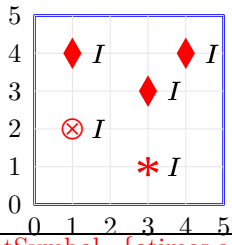
Utilisation du module **pst-eucl** (consultez le fichier **pst-eucl-doc.pdf**)

33.1 Basic elements

33.1.1 Points

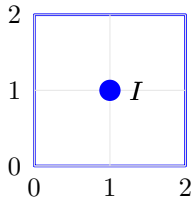
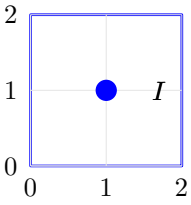
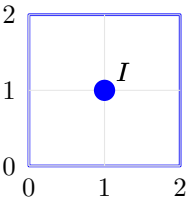
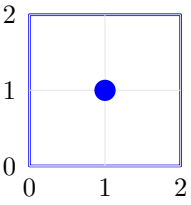
default axes	personalized axes
	
\pstGeonode(1,2){A}(3,1){A_1}(4,4){C} **\cnodeput**{0}(2,4){D}{D} [1]	\pstGeonode(3,1){A}(2,2){B}(4,2){C} **\pstOIJGeonode**(1,1){E}{A}{B}{C} (2,1){D}

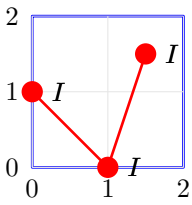
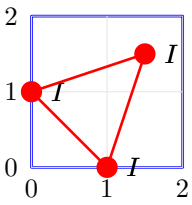
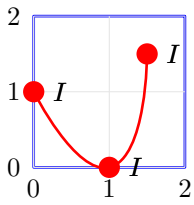
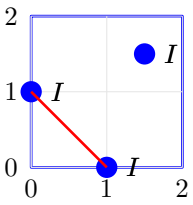
Point type			
parameter	sample [2]	parameter	sample
*	I	o	I
+	I	x	I
asterisk	I	oplus	I
otimes	I	|	I
triangle	I	triangle*	I
square	I	square*	I
diamond	I	diamond*	I
pentagon	I	pentagon*	I



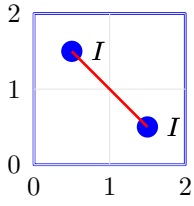
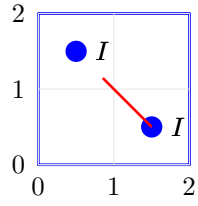
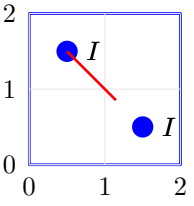
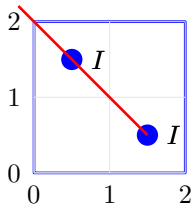
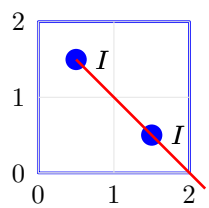
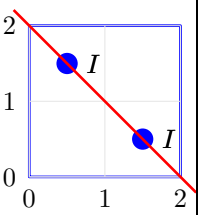
\pstGeonode[PointSymbol={otimes,asterisk,diamond*}]
(1,2){A}(3,1){B}(4,4){C}(3,3){D}(1,4){E}

1. other possible nodes see page 37
2. linecolor=blue,fillcolor=yellow,dotscale=2

\pstGeonode[PointNameSep=.7cm](1,1){A}			
			
By default	PointNameSep=.7cm	PosAngle=45	PointName=none
	By default= 1em	By default= 0	

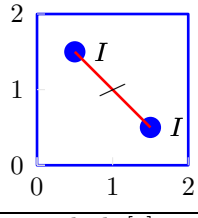
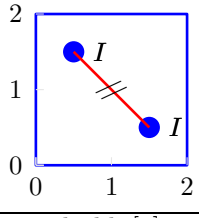
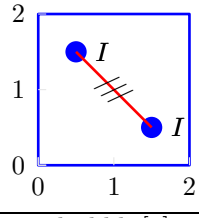
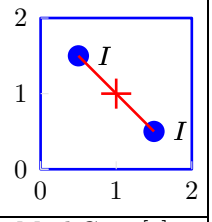
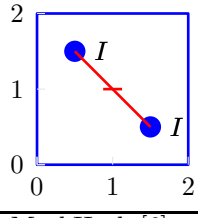
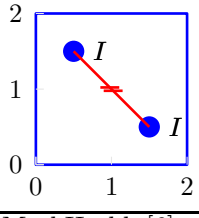
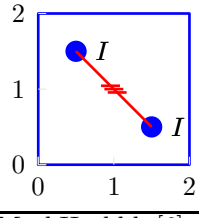
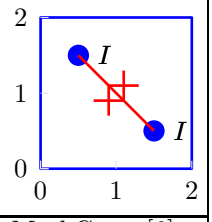
\pstGeonode[CurveType=polyline](0,1){A}(1,0){B}(1.5,1.5){C}			
			
CurveType=polyline	CurveType=polygon	CurveType=curve	**\ncline**{A}{B} [1]

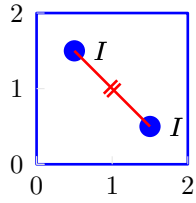
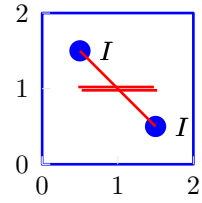
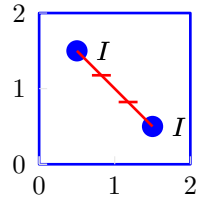
33.1.2 Lines

\pstLineAB[nodesepA=.5]{A}{B}		
		
By default	[nodesepA=0.5]	[nodesepB=0.5
		
[nodesepA=-1]	[nodesepB=-1]	[nodesep=-1]

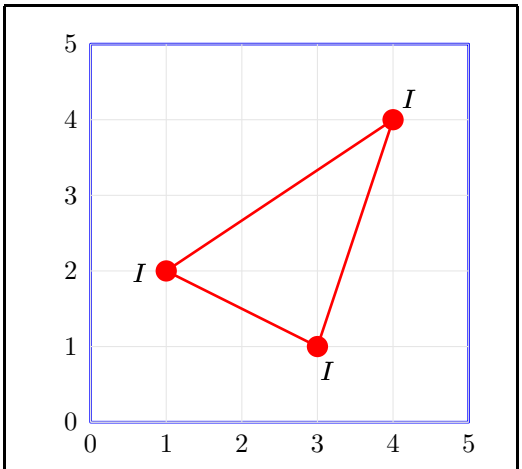
1. other possibilities see page 40

33.1.3 Marks

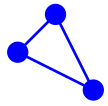
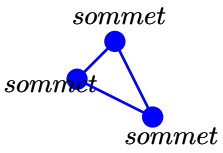
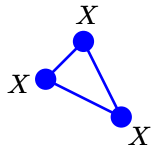
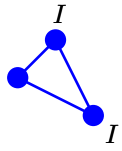
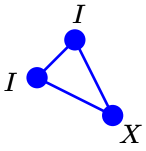
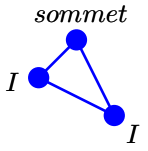
\pstSegmentMark[SegmentSymbol=pstslash]{A}{B}			
			
pstslash [6]	pstslashh [6]	pstslashhh [6]	MarkCros [6]
			
MarkHash [6]	MarkHashh [6]	MarkHashhh [6]	MarkCross [6]

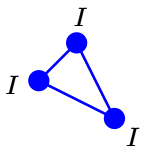
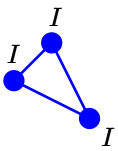
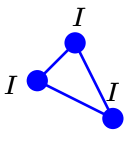
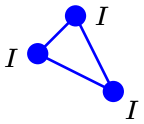
\pstSegmentMark[MarkAngle=90]{A}{B}		
		
MarkAngle=90	MarkHashLength=.5	MarkHashSep=.5
By default : 45	By default : 1.25mm	By default : .625mm

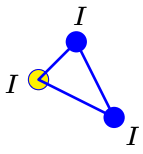
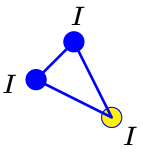
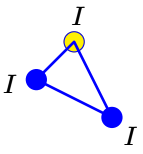
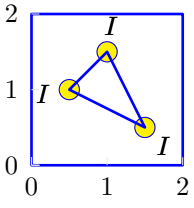
33.1.4 Triangles



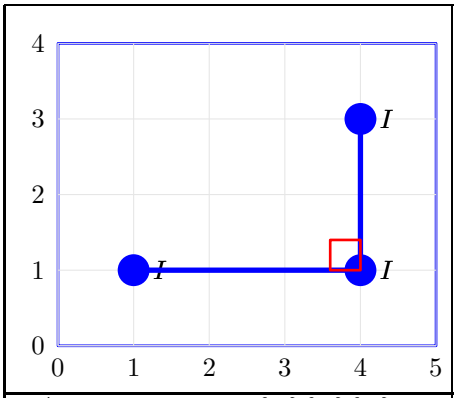
\pstTriangle(1,2){A}(3,1){P}(4,4){Z}

\pstTriangle[PointName=none](0.5,1){A}(1.5,0.5){B}(1,1.5){C}		
		
PointName=none	PointName=sommet	» A REVOIR «
		
PointNameA=none	PointNameB=X	PointNameC=sommet

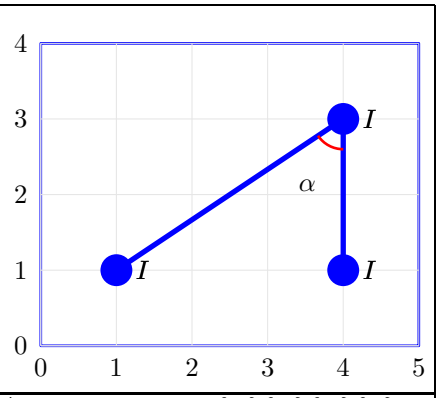
\pstTriangle[PosAngle=45](0.5,1){A}(1.5,0.5){B}(1,1.5){C}			
			
PosAngle=180	PosAngleA=90	PosAngleB=90	PosAngleC=0
By default : sur la bissectrice			

\pstTriangle[PointSymbolA=o](0.5,1){A}(1.5,0.5){B}(1,1.5){C}			
			
PointSymbolA=o	PointSymbolB=o	PointSymbolC=o	PointSymbol=o

33.1.5 Angles

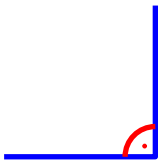


\pstRightAngle{A}{B}{C}

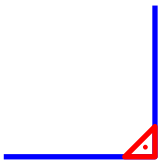


\pstMarkAngle{A}{C}{B}{α}

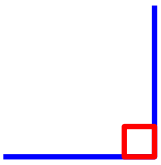
\pstRightAngle[linecolor=red,RightAngleType=german]{C}{B}{A}



RightAngleType= german [6]

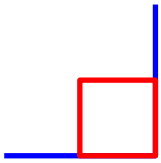


RightAngleType=suisseromand [6]

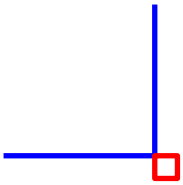


By default

\pstRightAngle[linecolor=red,RightAngleSize=1]{C}{B}{A}

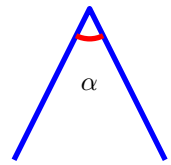
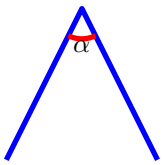
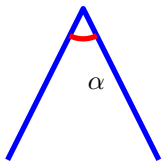
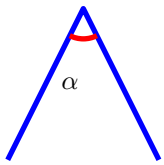
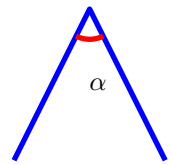
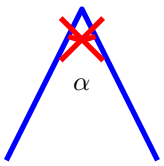
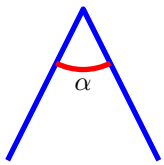
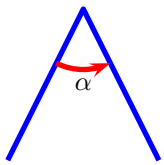


RightAngleSize=1

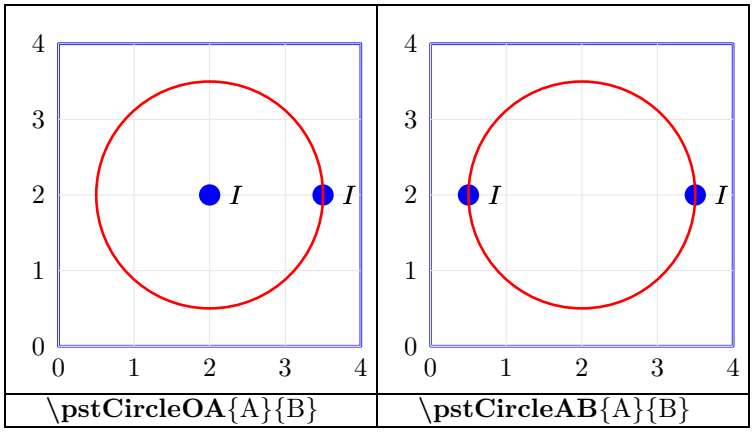


RightAngleSize=-.3

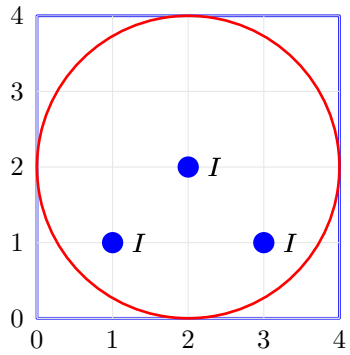
By default : RightAngleSize = 0.28 unit

\pstMarkAngle[LabelSep=.5]{A}{C}{B}{α}			
			
By default	LabelSep=.3cm	LabelAngleOffset=10	LabelAngleOffset=-10
	By default : 1	By default : 0	By default : 0
			
LabelRefPt=l	Mark=MarkCros	MarkAngleRadius=.8	arrows=->
By default : c		By default : .4	,MarkAngleRadius=.8

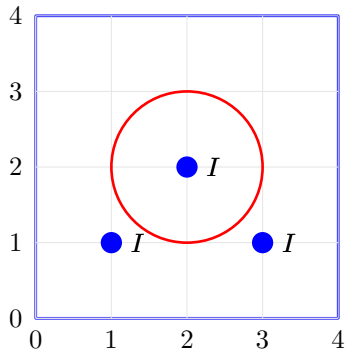
33.1.6 circles



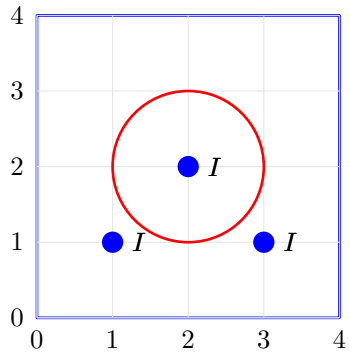
\pstCircleOA{A}{B}	\pstCircleAB{A}{B}



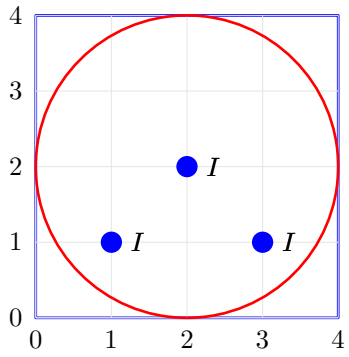
\pstCircleOA[
Radius=pstDistAB{B}{C}] {A}{}



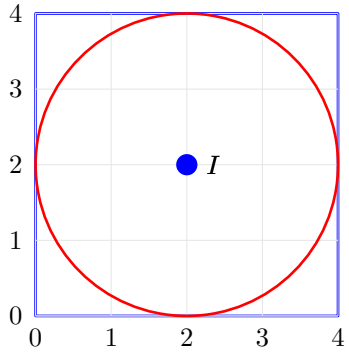
\pstCircleOA[
Diameter=pstDistAB{B}{C}] {A}{}



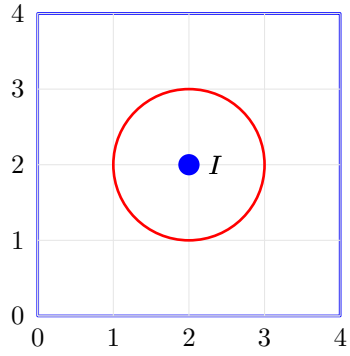
\pstCircleOA[DistCoef=.5
Radius=pstDistAB{B}{C}] {A}{}



\pstCircleOA[DistCoef=2
Diameter=pstDistAB {B}{C}] {A}{}

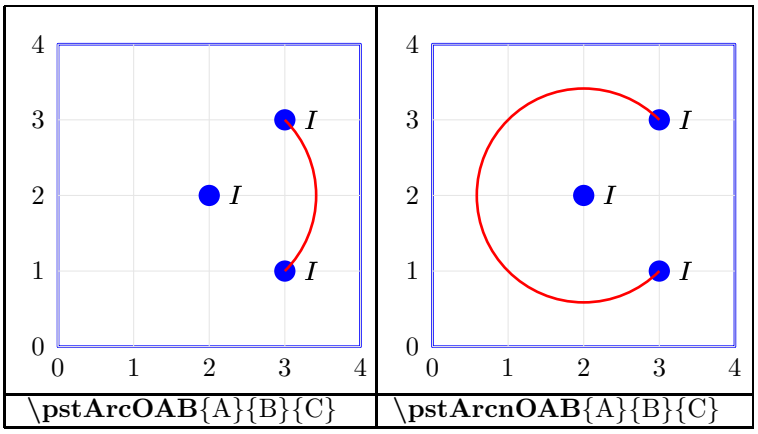


\pstCircleOA[Radius=pstDistVal{2}]{A}{} [6]



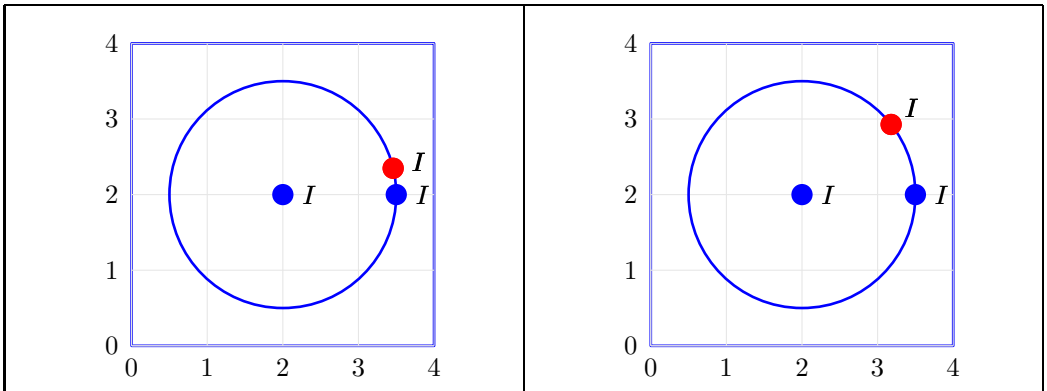
\pstCircleOA[Diameter=pstDistVal{2}]{A}{}

33.1.7 Arcs

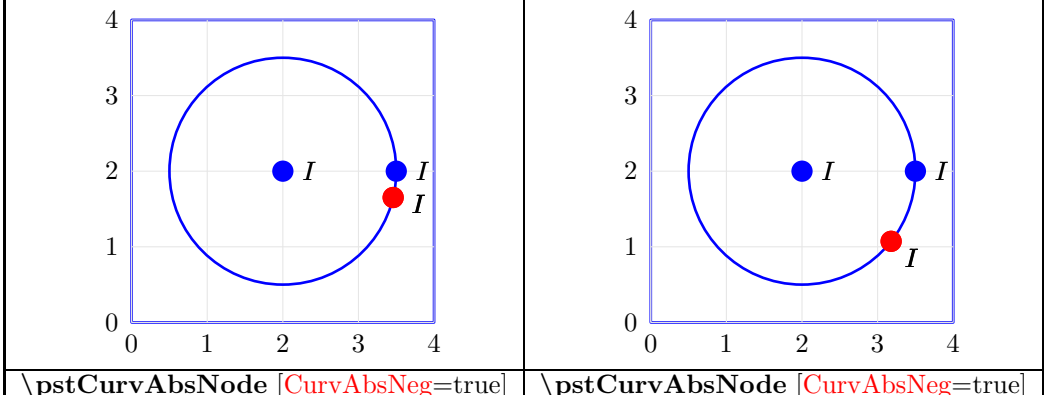


\pstArcOAB{A}{B}{C}	\pstArcnOAB{A}{B}{C}

33.2 Point on circle



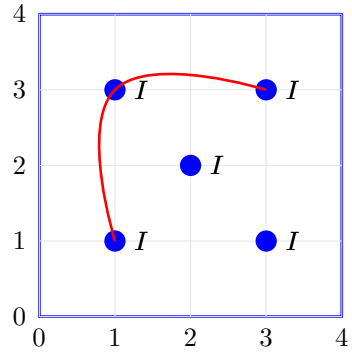
\pstCurvAbsNode{A}{B}{C} {10}	\pstCurvAbsNode{A}{B}{C} {\pstDistVal{1}}



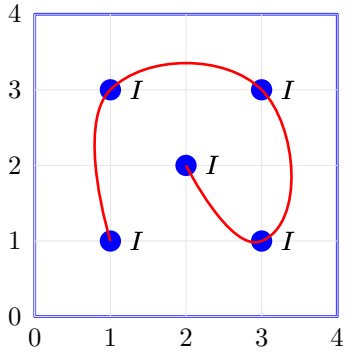
\pstCurvAbsNode [CurvAbsNeg=true] {A}{B}{C} {10}	\pstCurvAbsNode [CurvAbsNeg=true] {A}{B}{C} {\pstDistVal{1}}

33.2.1 Generic curve

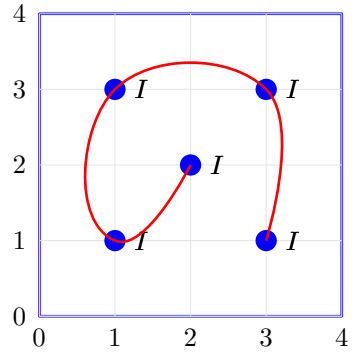
\pstGeonode(2,2){A} (3,1){B_1} (3,3){B_2} (1,3){B_3} {(}1,1)B_4



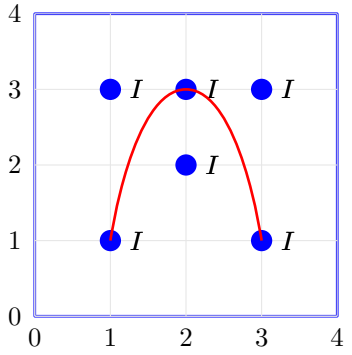
\pstGenericCurve{B_}{2}{4}



\pstGenericCurve [GenCurvFirst=A] {B_}{1}{4}



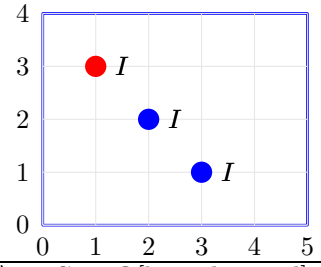
\pstGenericCurve[GenCurvLast=A] {B_}{1}{4}



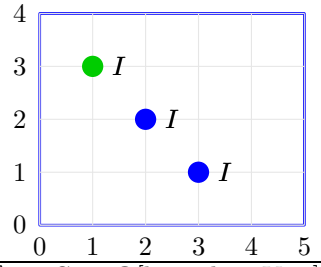
\pstGenericCurve[GenCurvInc=2] {B_}{1}{5}

33.3 Geometric transformations

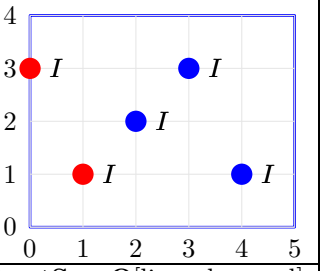
33.3.1 Central symmetry



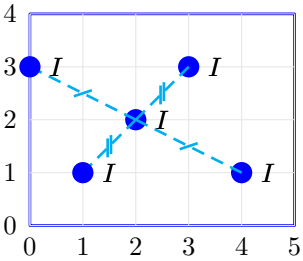
\pstSymO[linecolor=red] {A}{B}



\pstSymO[linecolor=Vert] {A}{B}[D]

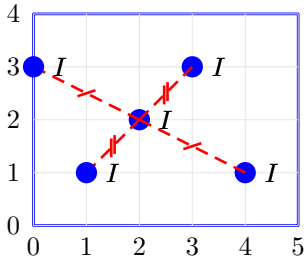


\pstSymO[linecolor=red] {A}{B,C}[D,E]



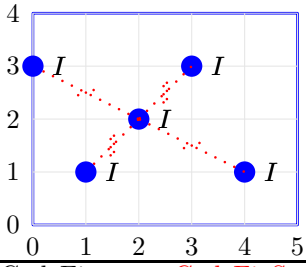
\pstSymO[CodeFig=true]
{A}{B,C}[D,E]

By default : CodeFig = false



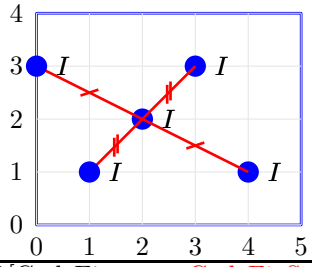
\pstSymO[CodeFig=true,CodeFigColor=red]
{A}{B,C}[D,E]

By default : CodeFigColor = cyan



\pstSymO[CodeFig=true,CodeFigStyle=dotted]
{A}{B,C}[D,E]

By default : CodeFigStyle = dashed

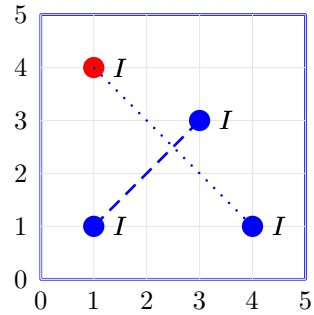


\pstSymO[CodeFig=true,CodeFigStyle=solid]
{A}{B,C}[D,E]

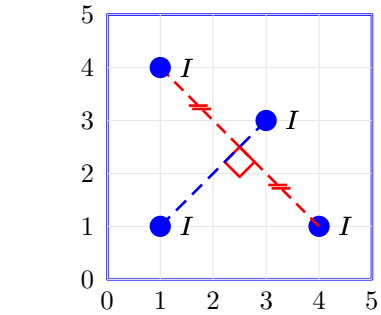
Autres options possibles : PointSymbol PosAngle PointName PointNameSep PtNameMath

33.3.2 Orthogonal symmetry

\pstOrtSym[options]{A}{B}{C}



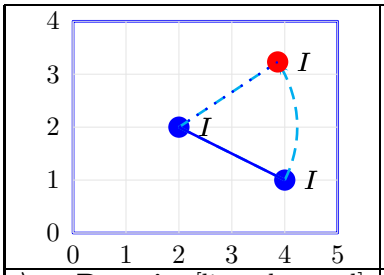
[linecolor=red]



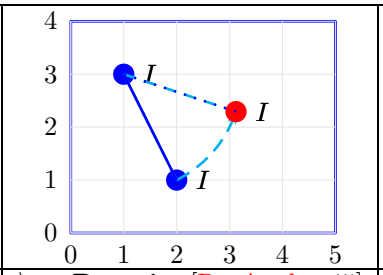
[CodeFig=true,CodeFigColor=red]

By default : CodeFigColor=cyan

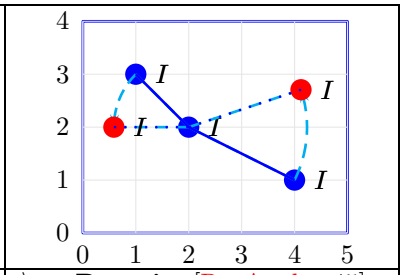
33.3.3 Rotation



\pstRotation[linecolor=red]{A}{B}



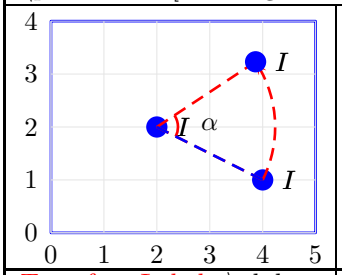
\pstRotation[RotAngle=45]{A}{C}[D]



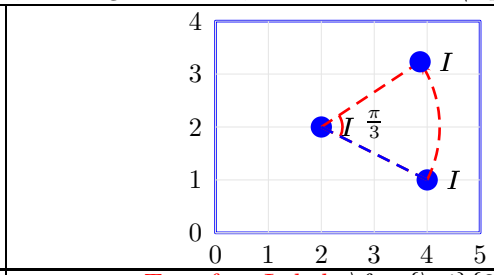
\pstRotation[RotAngle=45]{A}{B,C}[D,E]

By default : RotAngle=60

\pstRotation[CodeFig=true,CodeFigColor=red,TransformLabel=\alpha]{A}{B}

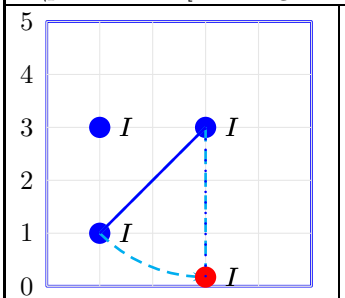


TransformLabel=\alpha

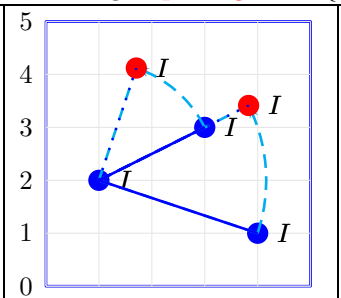


TransformLabel=\frac{\pi}{3}

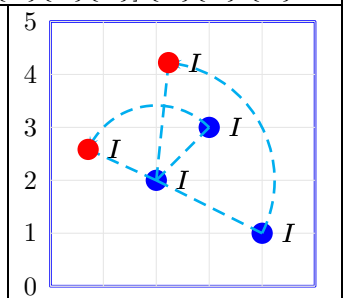
\pstRotation[CodeFig=true,RotAngle=pstAngleAOB{C}{A}{B}] {A}{B} {D}



Rotation = 45.0



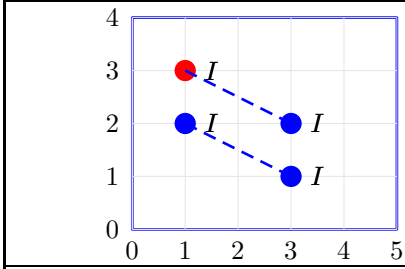
Rotation = 44.99



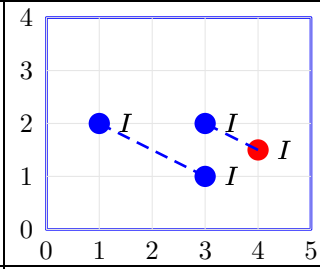
Rotation = 110.6

33.3.4 Translation

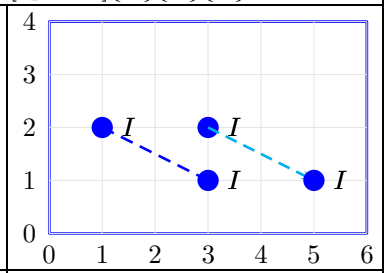
\pstTranslation[options]{B}{A}{C}



\pstTranslation[options]{A}{B}{C}



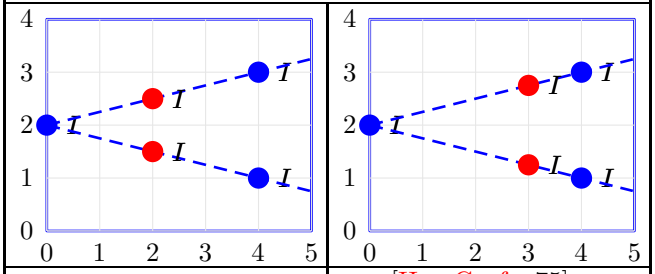
[DistCoef=0.5]



[CodeFig=true]

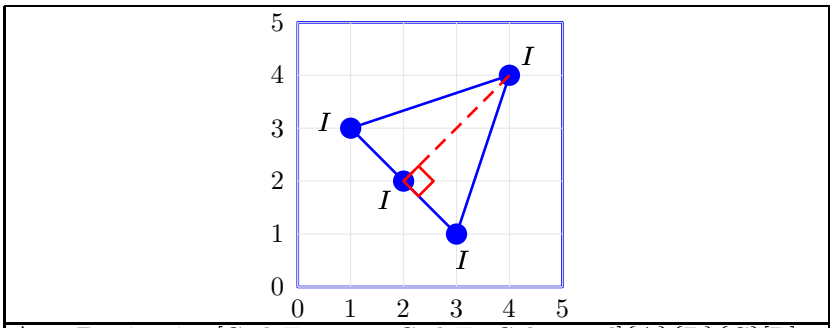
33.3.5 Homothetie

\pstHomO{A}{B,C}[D,E]



[HomCoef=.75]

33.3.6 Orthogonal projection

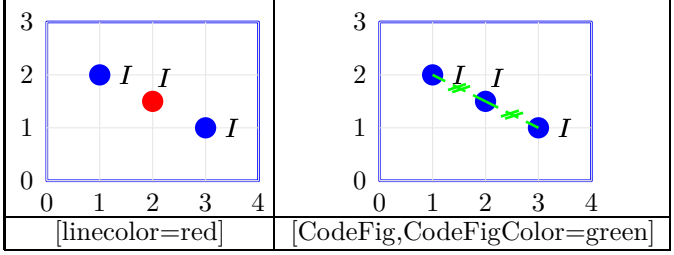


\pstProjection[CodeFig=true,CodeFigColor=red]{A}{B}{C}[D]

33.4 Particular constructions

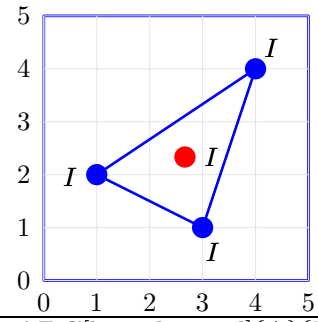
33.4.1 midpoint

\pstMiddleAB[linecolor=red]{A}{B}{C}



[linecolor=red] [CodeFig,CodeFigColor=green]

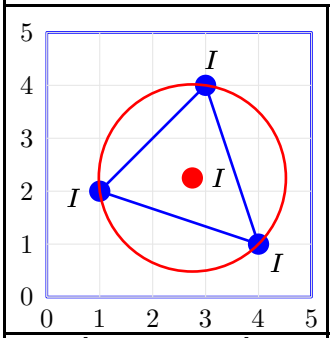
33.4.2 Center of gravity of a triangle



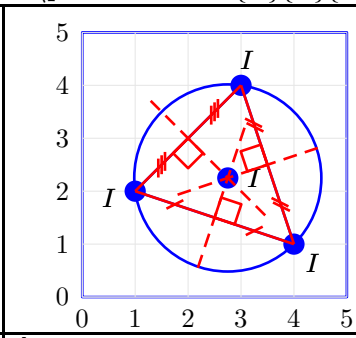
\pstCGravABC[linecolor=red]{A}{B}{C}{G}

33.4.3 Circumcenter of a triangle

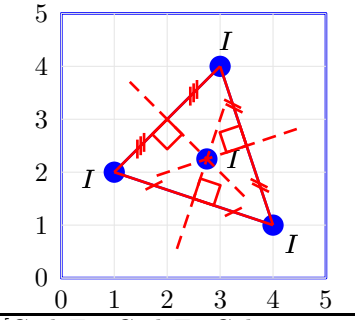
\pstCircleABC{A}{B}{C}{O}



[linecolor=red]

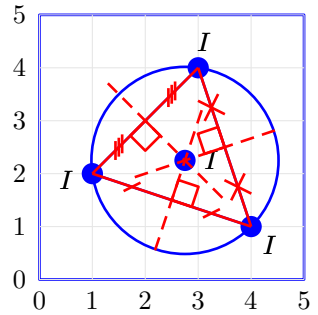


[CodeFig,CodeFigColor=green]

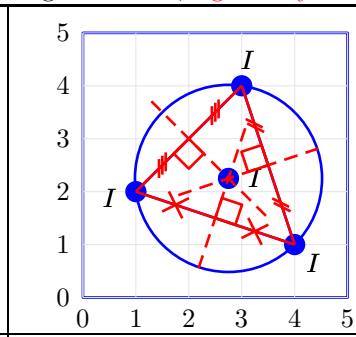


[CodeFig,CodeFigColor=green ,DrawCirABC=false

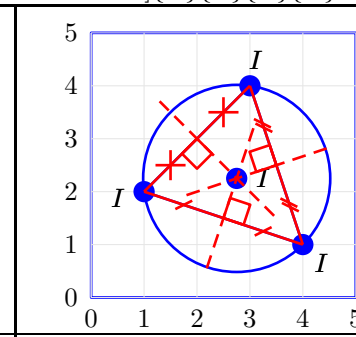
\pstCircleABC[CodeFig,CodeFigColor=red,SegmentSymbolA=MarkCros]{A}{B}{C}{O}



SegmentSymbolA=MarkCros

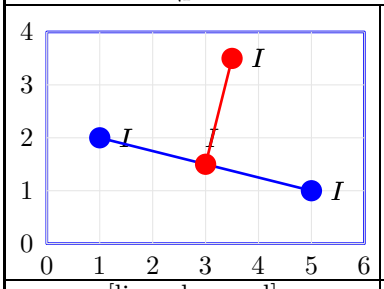
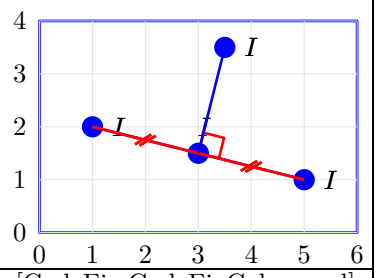


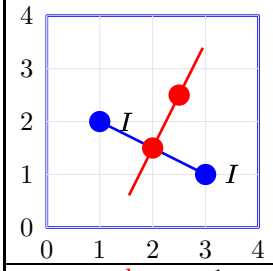
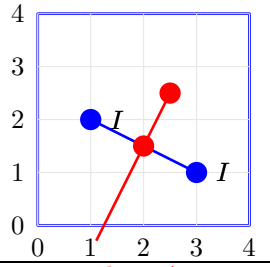
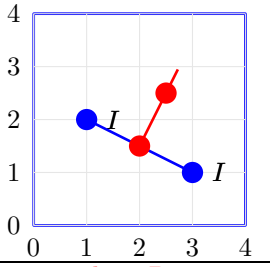
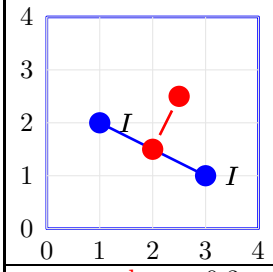
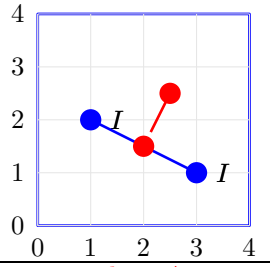
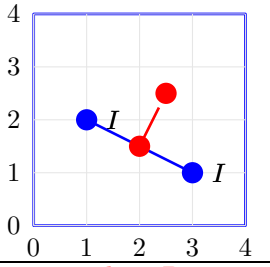
SegmentSymbolB=MarkCros



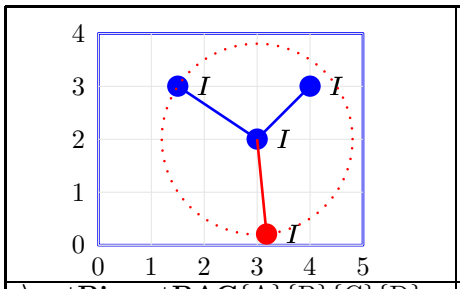
SegmentSymbolC=MarkCros

33.4.4 Perpendicular to a line

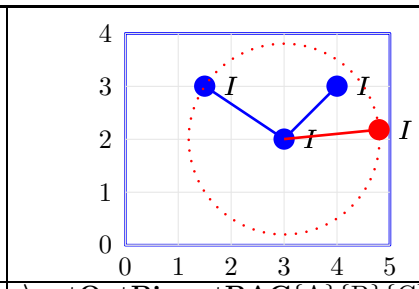
\pstMediatorAB{A}{B}{C}{D}	
	
[linecolor=red]	[CodeFig,CodeFigColor=red]

\pstMediatorAB[linecolor=red,PointName=none,nodesep=-1]{A}{B}{C}{D}		
		
nodesep=-1	nodesepA=-2	nodesepB=-0.5
		
nodesep=0.3	nodesepA=0.3	nodesepB=0.3

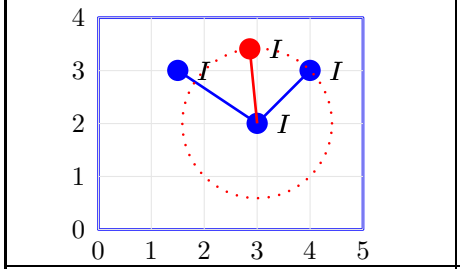
33.4.5 Bissector



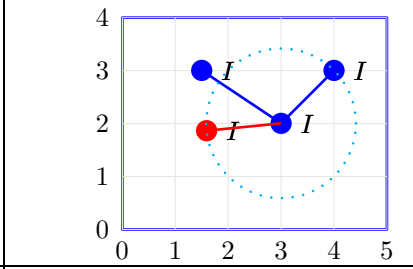
\pstBissectBAC{A}{B}{C}{D}



\pstOutBissectBAC{A}{B}{C}{D}



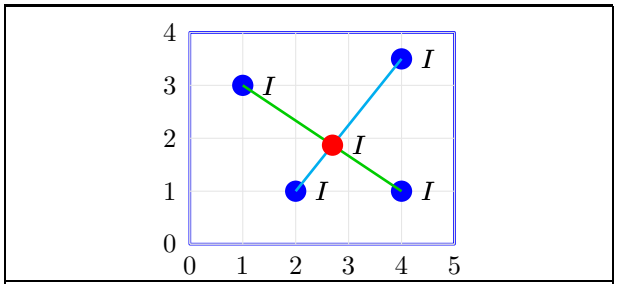
\pstBissectBAC{A}{B}{C}{D}



\pstOutBissectBAC{C}{B}{A}{D}

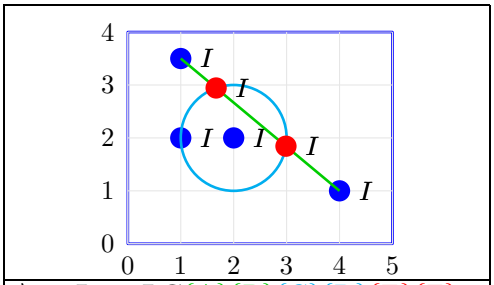
33.5 Intersections [6]

33.5.1 Intersection of two lines

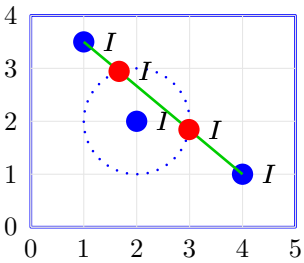


\pstInterLL[linecolor=red]{A}{B}{C}{D}{E}

33.5.2 Intersection of a line and a circle

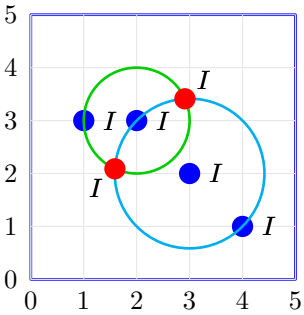


\pstInterLC{A}{B}{C}{D}{E}{F}

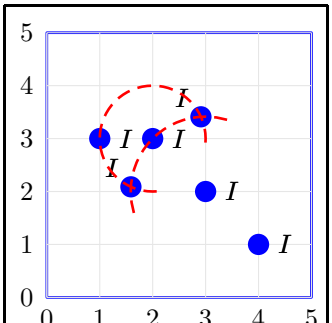


pstInterLC[Radius=\pstDistVal{1}]{A}{B}{C}{}{E}{F}

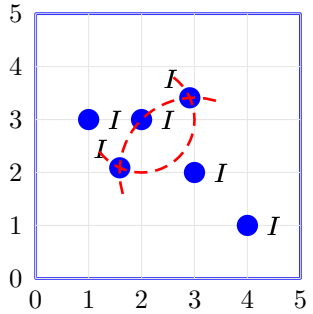
33.5.3 Intersection of two circles



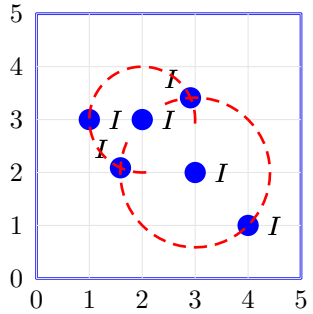
pstInterCC[linecolor=red,PosAngleA=45,PosAngleB=225]
{A}{B}{C}{D}{E}{F}



CodeFig=true

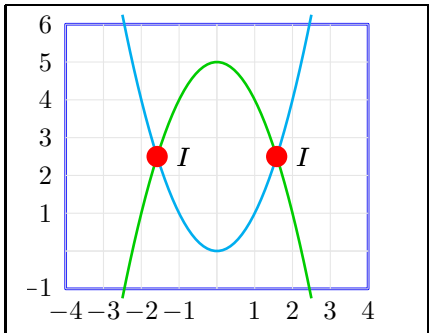


CodeFig=true
CodeFigAarc=false
By default : CodeFigAarc =true



CodeFig=true
CodeFigBarc=false
By default : CodeFigBarc =true

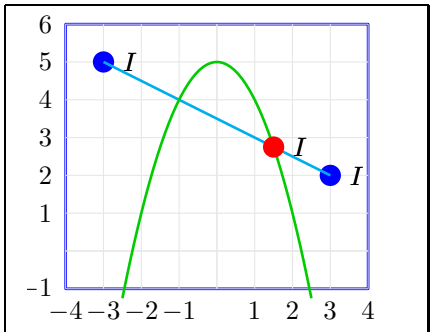
33.5.4 Intersection of two plots




```
\def \F{x 2 exp neg 5 add}
\def \G{x 2 exp}
\pstInterFF{\F}{\G}{1}{A}
\pstInterFF{\F}{\G}{-1}{B}
```

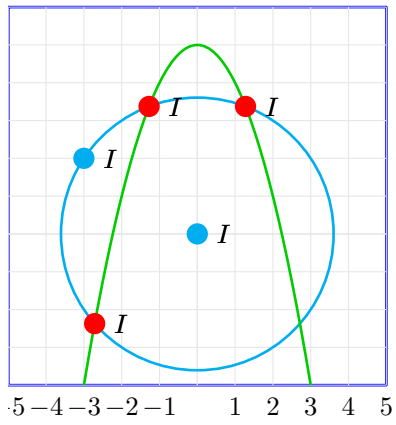
point of intersection nearest to x=-1

33.5.5 Intersection of a line and a curve




```
\pstLineAB{A}{B}
\def \F{x 2 exp neg 5 add}
\pstInterFL{\F}{A}{B}{1}{C}
```

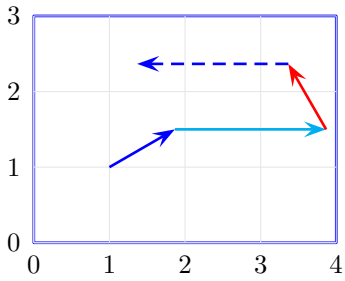
33.5.6 Intersection of a circle and a curve




```
\def \F{x 2 exp neg 5 add } : fonction 5 − x^2
\pstCircleOA{A}{B}
\pstInterFC{\F}{A}{B}{-1}{C}
\pstInterFC{\F}{A}{B}{1}{D}
\pstInterFC{\F}{A}{B}{3}{E}
\pstInterFC{\F}{A}{B}{1}{D}
\pstInterFC{\F}{A}{B}{3}{E}
```

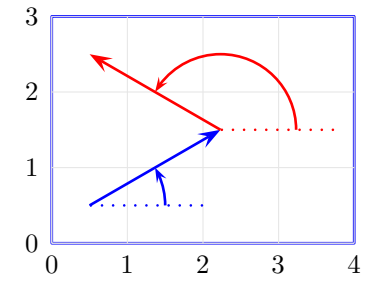
34 Vectors

34.1 Vectors chain

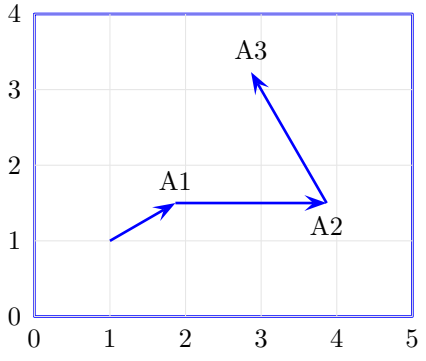



```
\psStartPoint(1,1)
\psVector[linecolor=blue](1;30)
\psVector[linecolor=cyan](2;0)
\psVector[linecolor=red](1;120)
\psVector[linestyle=dashed](2;180)
```

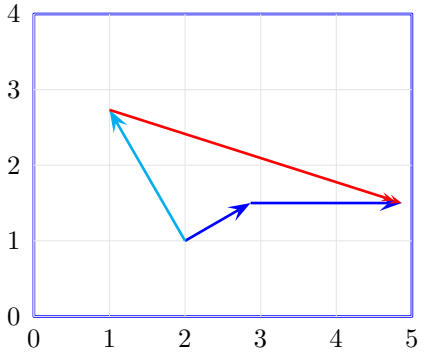
34.2 Options




```
\psStartPoint(.5,.5)
\psVector[linecolor=blue,markAngle](2;30)
\psVector[linecolor=red,markAngle](2;150)
```




```
\psStartPoint[A](1,1)
\uput[90](A1){A1}
\uput[-90](A2){A2}
```

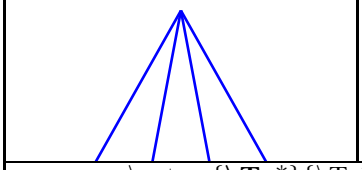
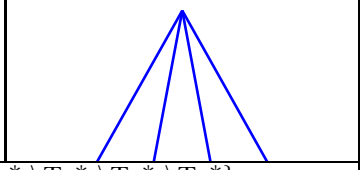
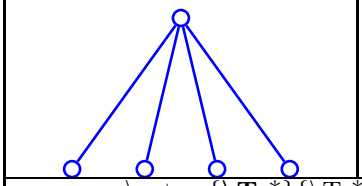
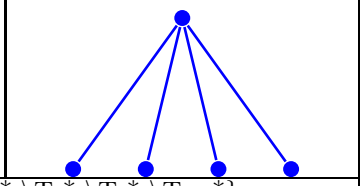
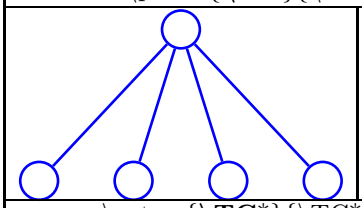
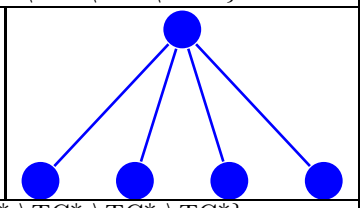
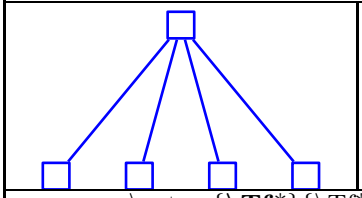
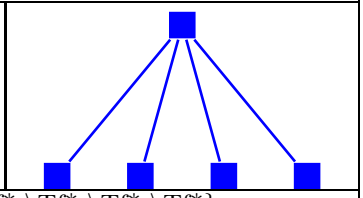
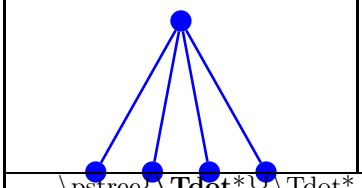
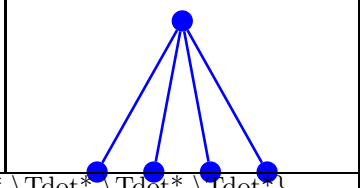


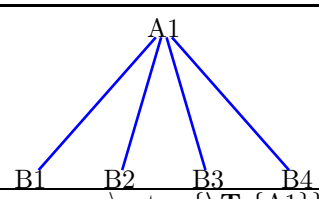
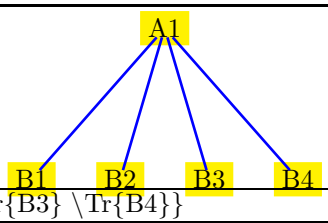
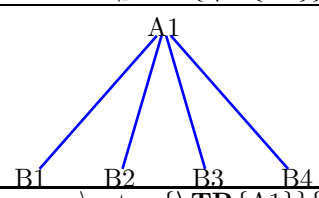
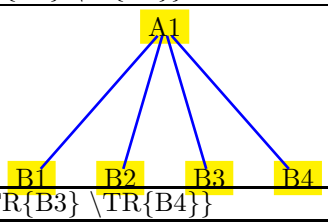
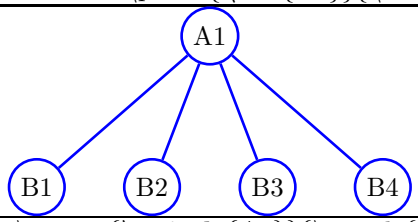
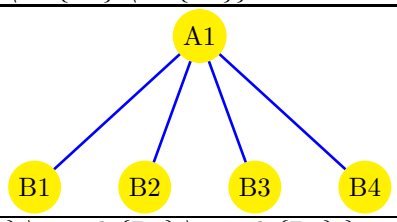
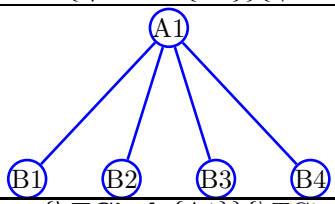
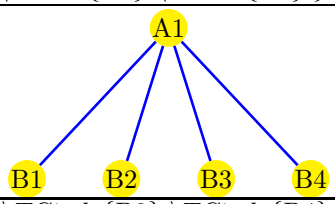
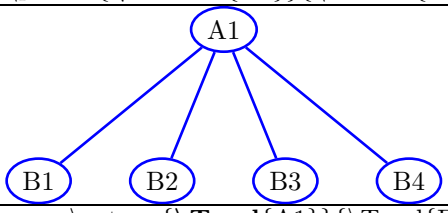
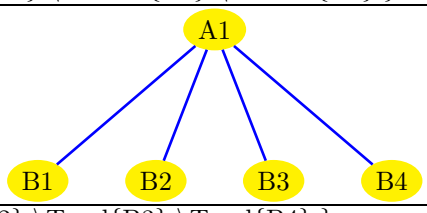
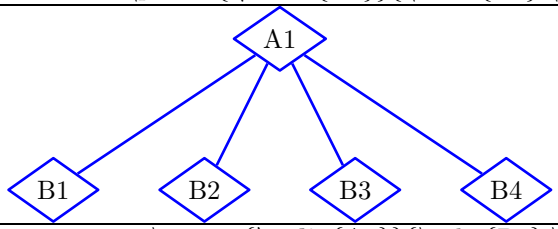
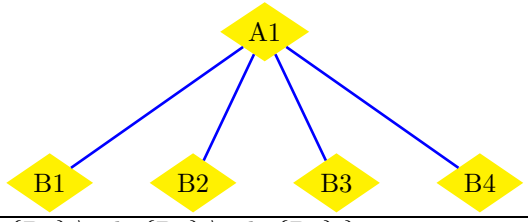
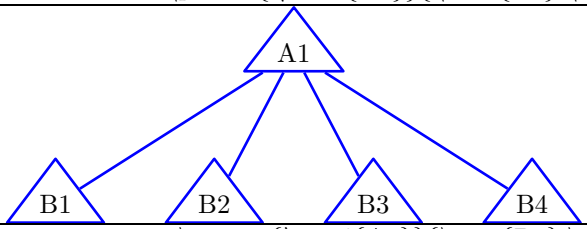
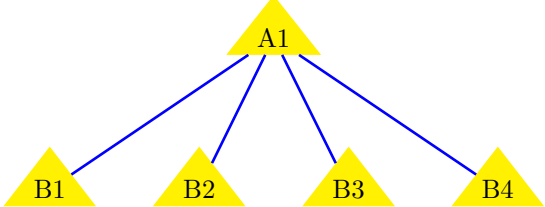

```
\psStartPoint[A](2,1)
\psStartPoint[B](2,1)
\psline[linecolor=red]{-»}(B1)(A2)
```

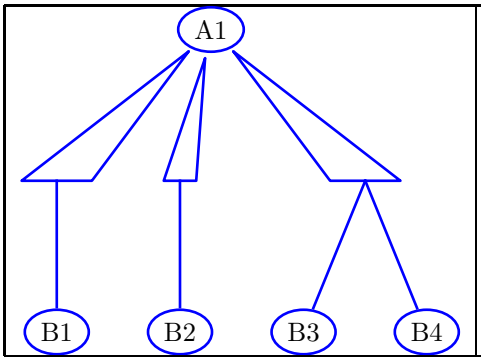
35 Trees

35.1 structure

35.2 The nodes

without asterisk	with asterisk
	
\pstree{\Tp*}{\Tp* \Tp* \Tp* \Tp*}	
	
\pstree{\Tc*}{\Tc* \Tc* \Tc* \Tc=*}	
	
\pstree{\TC*}{\TC* \TC* \TC* \TC*}	
	
\pstree{\Tf*}{\Tf* \Tf* \Tf* \Tf*}	
	
\pstree{\Tdot*}{\Tdot* \Tdot* \Tdot* \Tdot*}	

without asterisk	with asterisk
	
\pstree{**Tr**{A1}}{\Tr{B1} \Tr{B2} \Tr{B3} \Tr{B4}}	
	
\pstree{**TR**{A1}}{\TR{B1} \TR{B2} \TR{B3} \TR{B4}}	
	
\pstree {**Tcircle**{A1}}{\Tcircle{B1} \Tcircle{B2} \Tcircle{B3} \Tcircle{B4} }	
	
\pstree {**TCircle**{A1}}{\TCircle{B1} \TCircle{B2} \TCircle{B3} \TCircle{B4} }	
	
\pstree {**Toval**{A1}}{\Toval{B1} \Toval{B2} \Toval{B3} \Toval{B4} }	
	
\pstree {**Tdia**{A1}}{\Tdia{B1} \Tdia{B2} \Tdia{B3} \Tdia{B4} }	
	
\pstree {**Ttri**{A1}}{\Ttri{B1} \Ttri{B2} \Ttri{B3} \Ttri{B4} }	

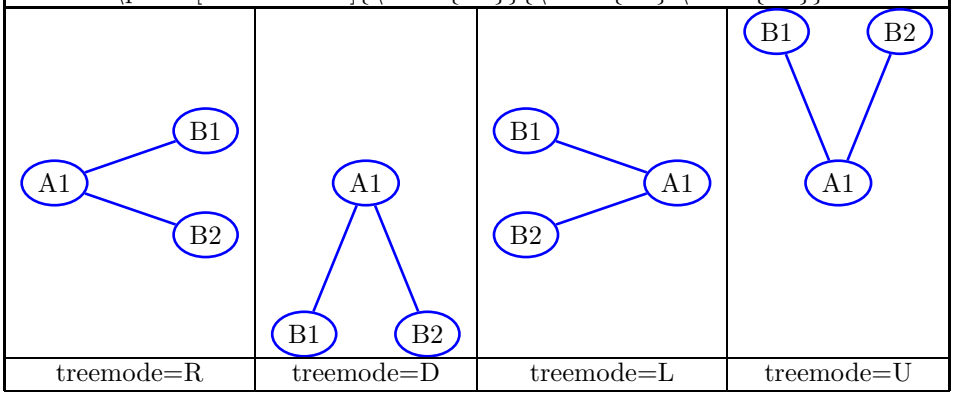



```
\pstree{\Toval{A1}}{%
\pstree{\Tfan}{\Toval{B1}}
\pstree{\Tfan[fansize=.5]}{\Toval{B2}}
\pstree{\Tfan}{\Toval{B3} \Toval{B4} }
}
```

By default : fansize= 1cm

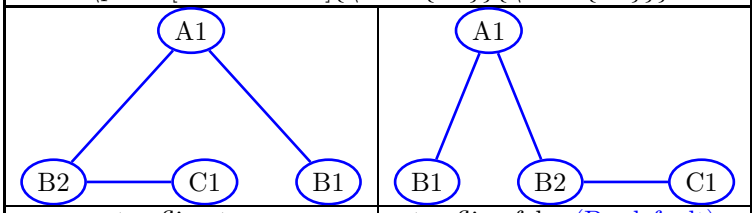
35.3 Orientation

```
\pstree[treemode=R]{\Toval{A1}}{\Toval{B1} \Toval{B2}}
```



treemode=R | treemode=D | treemode=L | treemode=U

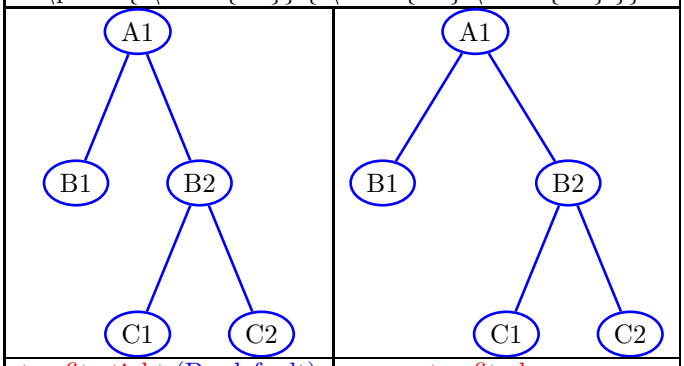
```
\pstree[treeflip=true]{ \Toval{A1}} {\Toval{B1}
\pstree[treemode=R]{\Toval{B2}}{\Toval{C1}}}
```



treeflip=true | treeflip=false (By default)

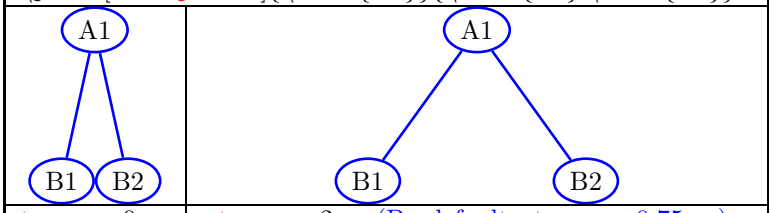
35.4 Distance between two nodes on the same level

\pstree[treefit=tight] { \Toval{A1}} { \Toval{B1}
\pstree{ \Toval{B2}} { \Toval{C1} \Toval{C2} }}



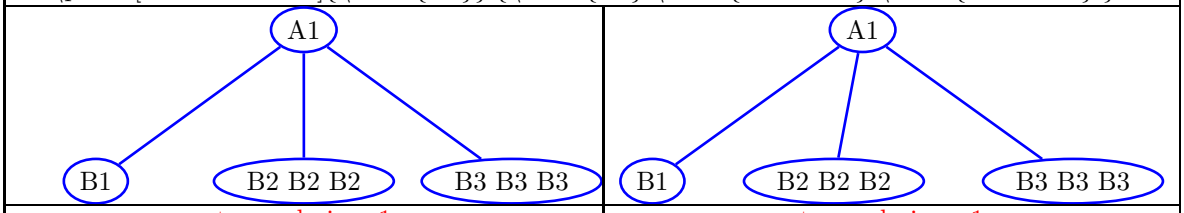
treefit=tight (By default) | treefit=loose

\pstree[treesep=0cm]{\Toval{A1}}{\Toval{B1} \Toval{B2}}



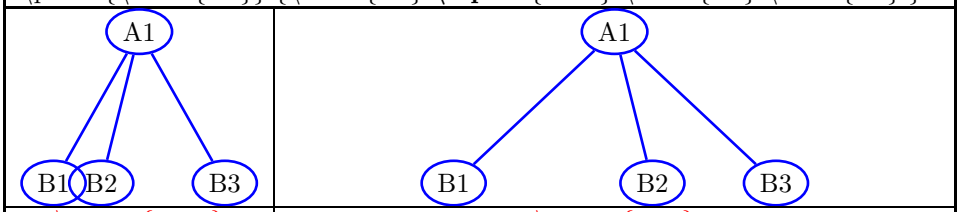
treesep=0cm | treesep=2cm (By default : treesep=0.75cm)

\pstree[treenodesize=1]{\Toval{A1}} {\Toval{B1} \Toval{B2 B2 B2} \Toval{B3 B3 B3} }

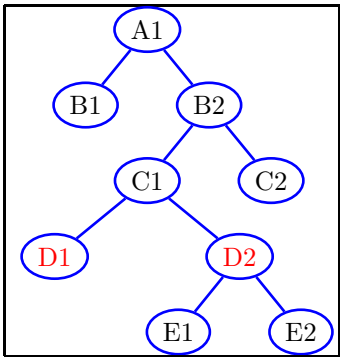


treenodesize=1 | treenodesize=-1

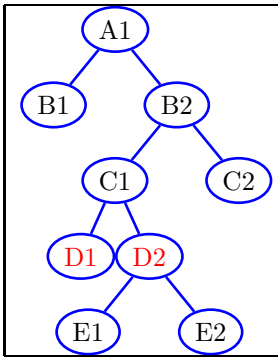
\pstree{\Toval{A1}} {\Toval{B1} **\tspace**{-1cm} \Toval{B2} \Toval{B3} }



\tspace{-1cm} | \tspace{1cm}



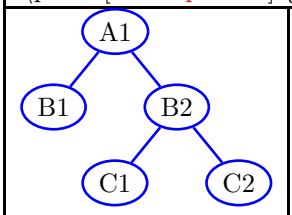

```
\pstree[levelsep=1cm]{\Toval{A1}}
{\Toval{B1}
\pstree{\Toval{B2}}{
\pstree[thistreefit=loose]{\Toval{C1}}
{\Toval{D1}
\pstree{\Toval{D2}}
{\Toval{E1}
\Toval{E2}}}
\Toval{C2}}}
```



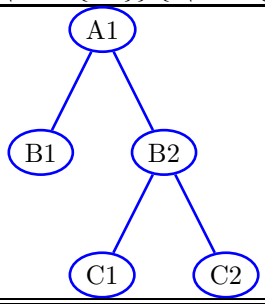

```
\pstree[levelsep=1cm]{\Toval{A1}}
{\Toval{B1}
\pstree{\Toval{B2}}{
\pstree[thistreesep=0]{\Toval{C1}}
{\Toval{D1}
\pstree{\Toval{D2}}
{\Toval{E1}
\Toval{E2}}}
\Toval{C2}}}
```

35.5 Distance between successive nodes

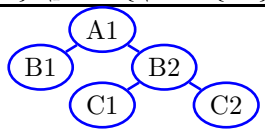
```
\pstree[levelsep=1cm] {\Toval{A1}} { \Toval{B1} \pstree{\Toval{B2}} {\Toval{C1} \Toval{C2}} }
```



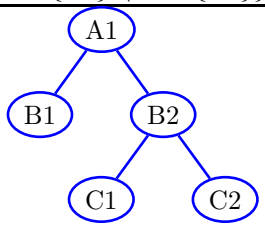
levelsep=1cm



levelsep=*1cm

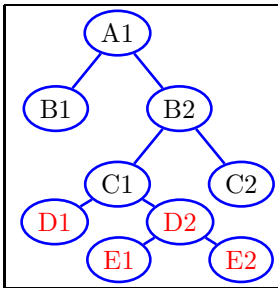


levelsep=.5cm

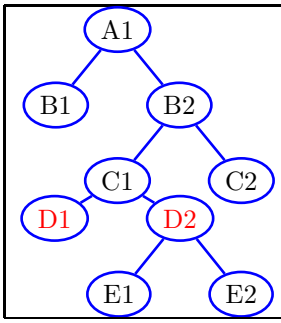


levelsep=*.5cm

(By default : 2cm)

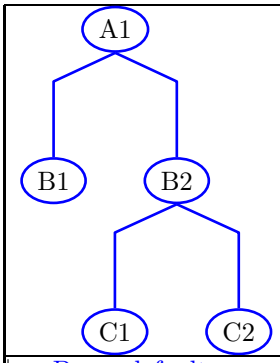


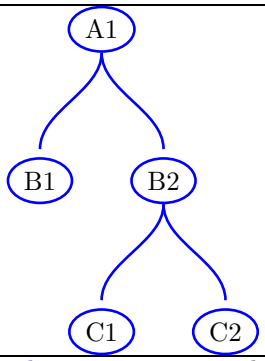

```
\pstree[levelsep=1cm]{\Toval{A1}}
{\Toval{B1}
\pstree{\Toval{B2}}{
\pstree[ levelsep=0.5cm]{\Toval{C1}}
{\Toval{D1}
\pstree{\Toval{D2}}
{\Toval{E1}
\Toval{E2}}}
\Toval{C2}}}
```




```
\pstree[levelsep=1cm]{\Toval{A1}}
{\Toval{B1}
\pstree{\Toval{B2}}{
\pstree[thislevelsep=0.5cm]{\Toval{C1}}
{\Toval{D1}
\pstree{\Toval{D2}}
{\Toval{E1}
\Toval{E2}}}
\Toval{C2}}}
```

35.6 Connecting the nodes

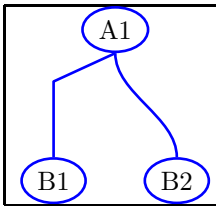




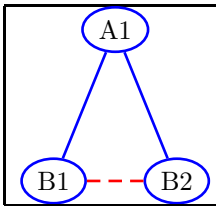
the 2 ways to set the connection type :

```
\renewcommand{\psedge}
{\ncdiag[angle=-
90,armA=0,angleB=90,armB=1cm]}

\def\psedge{\nccurve[angleA=-90
,angleB=90,nodesepB=3pt]}
```

By default : \ncline other connection see page 40




```
\pstree{\Toval{A1}}
{\Toval[edge={\ncdiag[angleA=-90,angleB=90,armA=0,armB=1cm]}]{B1}
\Toval[edge={\nccurve[angleA=-90,angleB=90]}]{B2}}
```

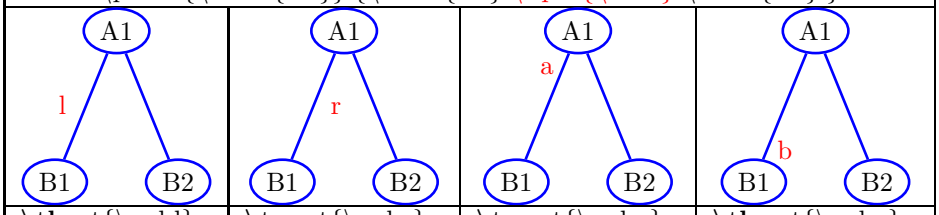



```
\pstree{\Toval{A1}}
{\Toval[name=A]{B1}\Toval[name=B]{B2}}
\ncline[linestyle=dashed,linecolor=red]{A}{B}
```

35.7 Labels

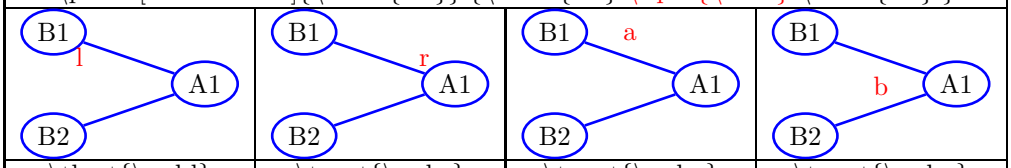
35.7.1 Labels on the connection

\pstree{\Toval{A1}} {\Toval{B1} \tlput{\red l} \Toval{B2} }



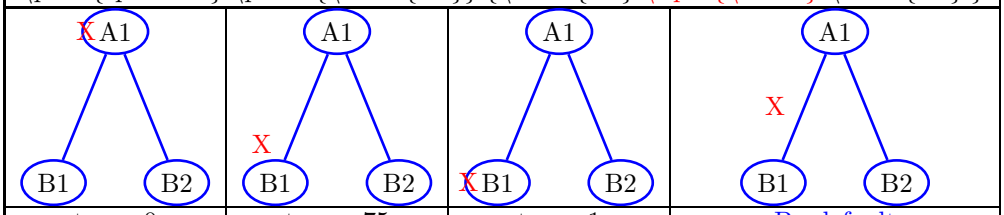
\tlput{\red l}	\trput{\red r}	\taput{\red a}	\tbput{\red a}

\pstree[treemode=L]{\Toval{A1}} {\Toval{B1} \tlput{\red l} \Toval{B2} }



\tlput{\red l}	\trput{\red r}	\taput{\red a}	\taput{\red a}

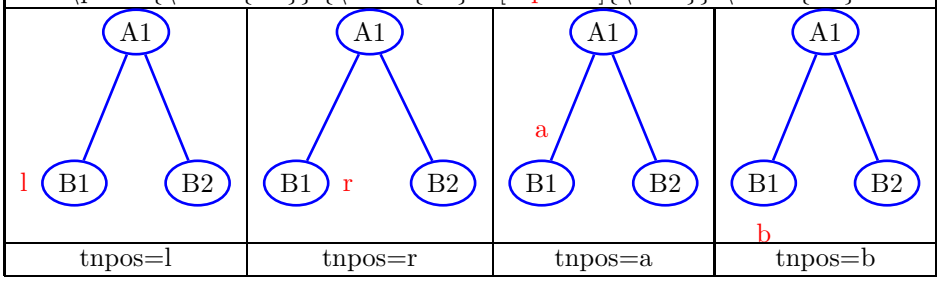
\psset{tpos=.75} \pstree{\Toval{A1}} {\Toval{B1} \tlput{\red X} \Toval{B2} }



tpos=0	tpos=.75	tpos=1	By default

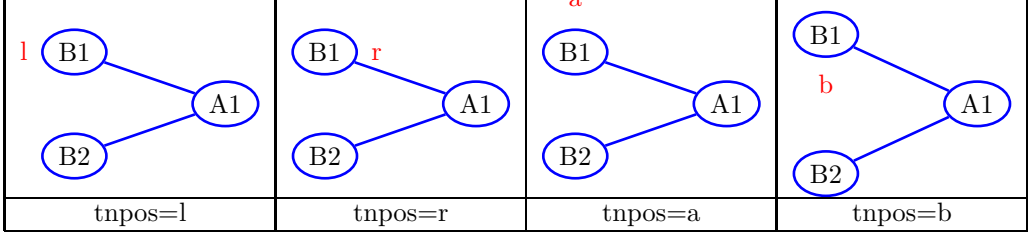
35.7.2 Labels on the nodes

\pstree{\Toval{A1}} {\Toval{B1} ~[tnpos=l]{\red l}} \Toval{B2}

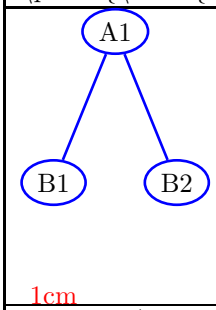
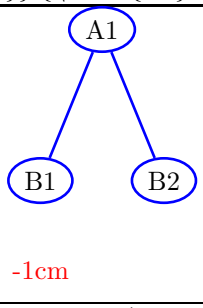
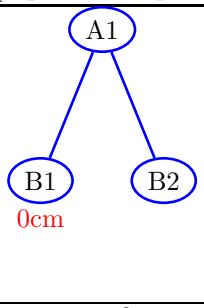
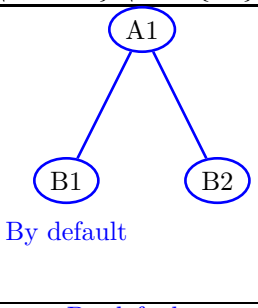


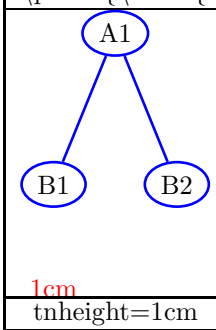
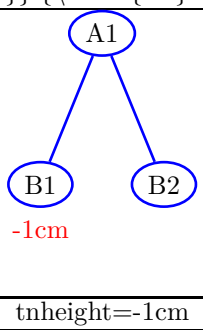
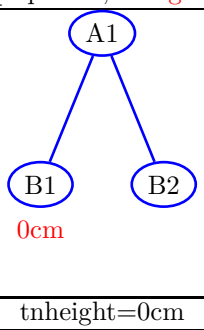
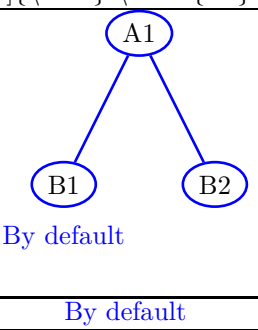
tnpos=l	tnpos=r	tnpos=a	tnpos=b

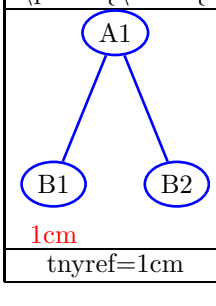
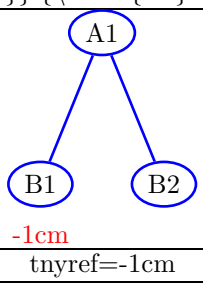
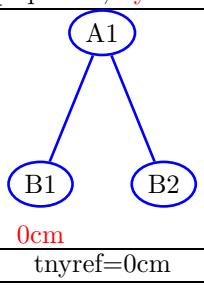
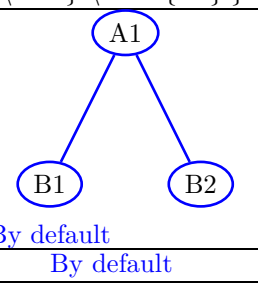
\pstree[treemode=L]{\Toval{A1}} {\Toval{B1} ~[tnpos=l]{\red l} \Toval{B2} }



tnpos=l	tnpos=r	tnpos=a	tnpos=b

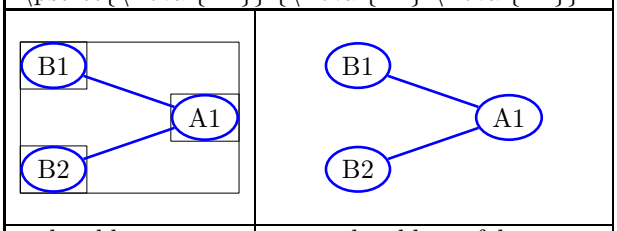
\pstree{\Toval{A1}} {\Toval{B1} ~[tnpos=b,tnsep=1cm]{\red 1cm} \Toval{B2} }			
			
tnsep=1cm	tnsep=-1cm	tnsep=0cm	By default

\pstree{\Toval{A1}} {\Toval{B1} ~[tnpos=b,tnheight=1cm]{\red l} \Toval{B2} }			
			
tnheight=1cm	tnheight=-1cm	tnheight=0cm	By default

\pstree{\Toval{A1}} {\Toval{B1} ~[tnpos=b,tnyref=1cm]{\red l} \Toval{B2} }			
			
tnyref=1cm	tnyref=-1cm	tnyref=0cm	By default

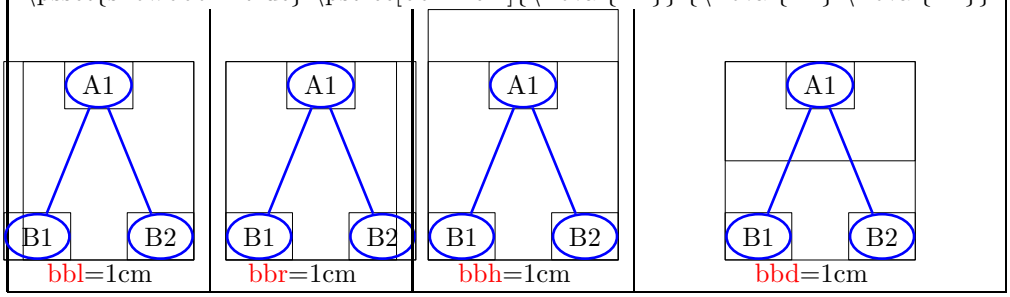
35.8 Showbbox

\psset{showbbox=true}
\pstree{\Toval{A1}} {\Toval{B1} \Toval{B2}}



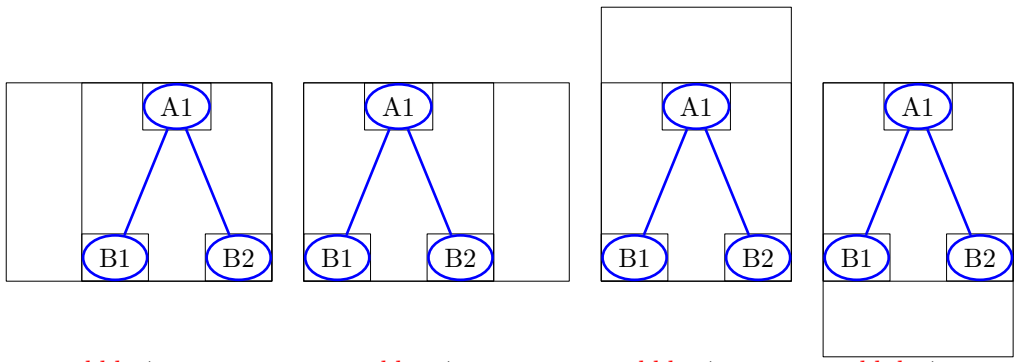
showbbox=true | showbbox=false

\psset{showbbox=true} \pstree[bbl=1cm]{\Toval{A1}} {\Toval{B1} \Toval{B2}}

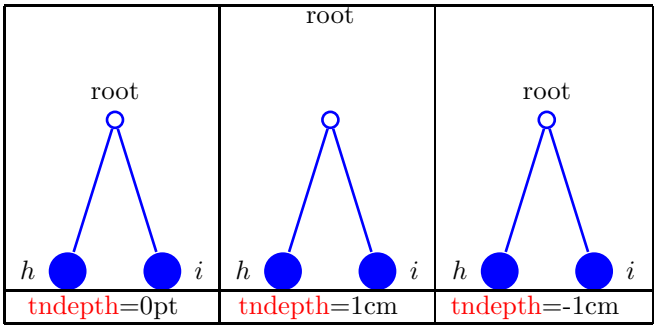


bbl=1cm | bbr=1cm | bbh=1cm | bbd=1cm

\psset{showbbox=true} \pstree[xbbl=1cm]{\Toval{A1}} {\Toval{B1} \Toval{B2}}

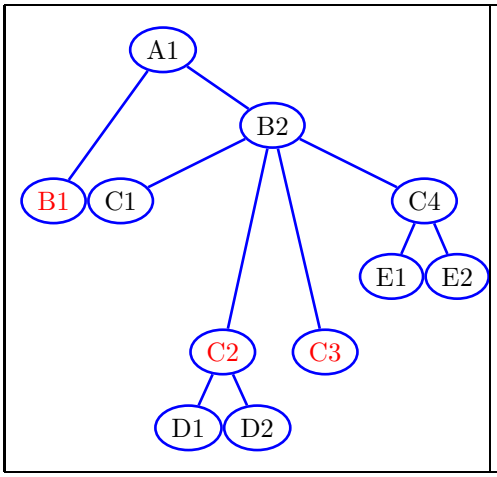


xbbl=1cm | xbbr=1cm | xbbh=1cm | xbbd=1cm



tndepth=0pt | tndepth=1cm | tndepth=-1cm

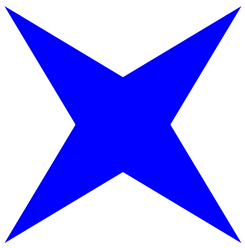
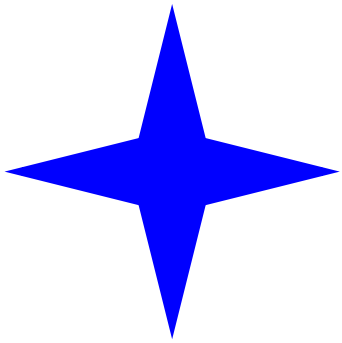
35.9 skiplevel

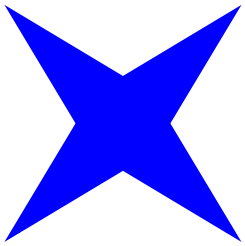



```
\pstree[levelsep=1cm,treesep=0cm]{\Toval{A1}}{%

\skiplevel {\Toval{\red B1} }

\pstree{\Toval{B2}}{%
\Toval{C1}

\skiplevels{2}
\pstree{\Toval{\red C2}}{\Toval{D1}
\Toval{D2}}
\Toval{\red C3}
\endskiplevels

\pstree{\Toval{C4}}{\Toval{E1} \Toval{E2}}}}
```

36 Animations

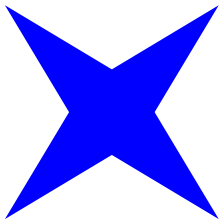
36.1 Animation from picture files

first frame	second and last frame
	
\includegraphics{XXX1.ps}	\includegraphics{XXX2.ps}



\animategraphics :	
[controls,	:Inserts control buttons
loop	:animation restarts automatically
autoplay]	:Start animation automatically
{4}	:4 frame per second
{XXX}	:file base name
{1}	:number of the first frame
{2}	:number of the last frame

36.2 Animateinline



```
\begin{animateinline}[controls,loop,autoplay]{5}

% first frame
\begin{pspicture}(6,6)
\psdiamond*[gangle=45](3,3)(2,.5)
\psdiamond*[gangle=135](3,3)(2,.5)
\end{pspicture}

% second frame
\newframe
\begin{pspicture}(6,6)
\psdiamond*[gangle=0](3,3)(2,.5)
\psdiamond*[gangle=90](3,3)(2,.5)
\end{pspicture}

\end{animateinline}
```

36.3 Multiframe

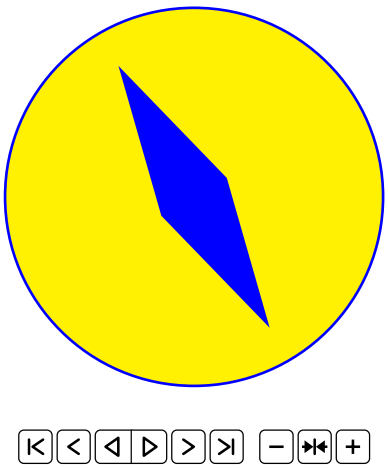
80 2.

```
\begin{animateinline}[poster=first,controls,
palindrome]{12}
\multiframe{29}{iAngle=80+10,
Rdim=2.0+-0.2}{
\begin{pspicture}(6,6)
\psdiamond*[gangle=\iAngle](3,3)(\Rdim,.5)
\rput(1,1){\iAngle}
\rput(5,1){\Rdim}
\end{pspicture} }
\end{animateinline}
```

The first letter of the variable name determines his type

entier	initiale : i ou I
réelles	initiale : n, N, r ou R
longueurs	initiale : d ou D

36.4 Timeline



```
\begin{animateinline}
[controls,autoplay,timeline=xxx.txt]{5}

% first background image (image N° 0)
\begin{pspicture}(6,6)
\pscircle[fillcolor=yellow,fillstyle=solid](3,3){2.5}
\end{pspicture}

\newframe % second background image (image
N° 1)
\begin{pspicture}(6,6)
\pscircle[linecolor=red,fillcolor=green,fillstyle=solid](3,3){2.5}
\end{pspicture}

\newframe % animation frames (images N° 2 -
11)
\multiframe{10}{iAngle=60+10}{
\begin{pspicture}(6,6)
\psdiamond*[gangle=\iAngle](3,3)(2,.5)
\end{pspicture} }
\end{animateinline}
```

36.4.1 Creation of the file for timeline

to create the file xxx.txt, insert the following code before \begin{document}

```
\begin{filecontents}{xxx.txt}
: :0x0,8
: :2
: :7
: :3
: :6
: :c,1x3,5
: :4
: :11
: :5
: :7
: :9
\end{filecontents}
```

0x0 : image N° 0 = background image for all frame

c : clear the background image

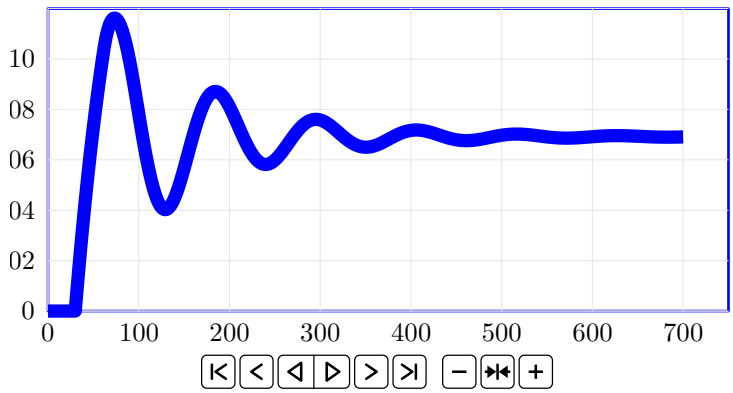
1x3 : image N° 1 = background image for 3 frames

Order of frames : 8,2,7,3,6,5,4,11,5,7,9

36.4.2 option for the file xxx.txt

* : : 3	pause at frame N° 3
: 10 : 3	10 frames per second at frame N° 3
: : 3 : code	java code at frame N° 3

36.5 Graph animation

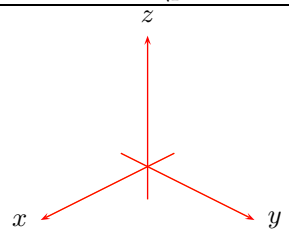


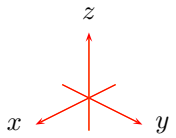
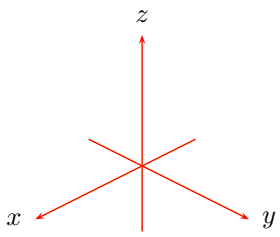
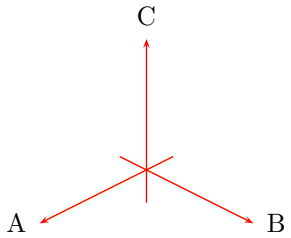

```
    \readdata{\dat}{mesdata.dat}
\begin{animateinline}[poster=last,controls]{5}
\multiframe{70}{ifin=10+10}{
\begin{psgraph}[axesstyle=frame,xticksize=0 4cm,yticksize=0 9cm,subticks=0,Dx=100,Dy=.02](0,0)(750,.12){9cm}{4
\listplot[xEnd=\ifin,linecolor=blue,linewidth=5pt]{\dat}
\end{psgraph} }
\end{animateinline}
```

37 3D drawing

Utilisation du module **pst-3dplot**

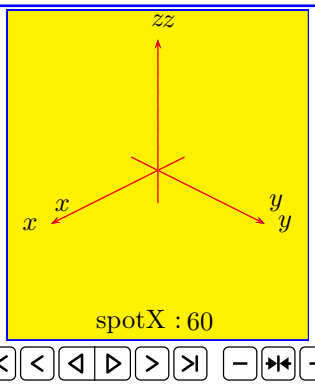
37.1 3 D axis

\pstThreeDCoor	
	
drawing=true (By default)	drawing=false

\pstThreeDCoor[xMax=2,yMax=2,zMax=2]		
		
xMax=2,yMax=2,zMax=2	xMin=-2,yMin=-2,zMin=-2	nameX=A,nameY=B,nameZ=C
By default : xMax=yMax=zMax=4	By default : xMin=yMin=zMin=-1	

37.1.1 Option spotX

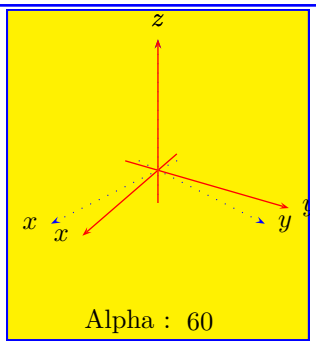
\pstThreeDCoor[spotX=60,spotY=60,spotZ=60]



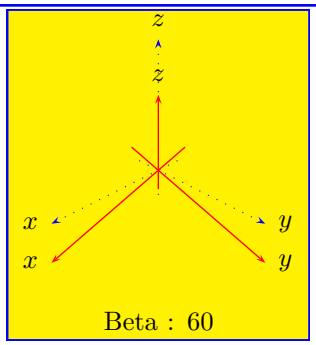
37.1.2 Axis orientation

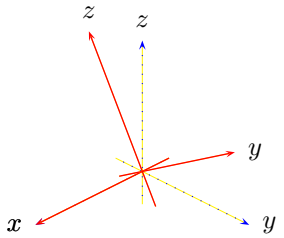
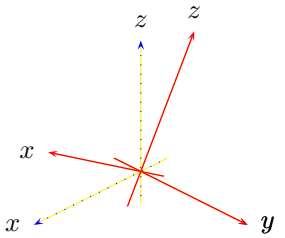
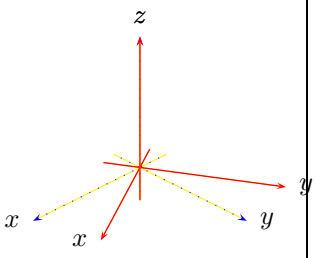
\pstThreeDCoor[linecolor=blue,linestyle=dotted]

\pstThreeDCoor[Alpha=30]



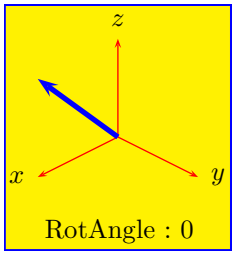
\pstThreeDCoor[Beta=30]



\pstThreeDCoor[linestyle=dotted,linecolor=blue] \pstThreeDCoor[RotX=30]		
		
RotX=30	RotY=-30	RotZ=30
By default : RotX=0	By default : RotY=0	By default : RotZ=0

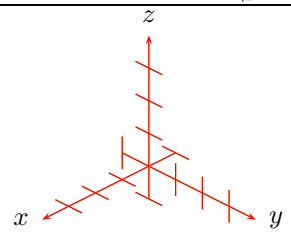
\pstThreeDCoor[RotSequence=quaternion,RotAngle=10,
xRotVec=3,yRotVec=0,zRotVec=3,
xMin=0,xMax=3, yMin=0,yMax=3, zMin=0,zMax=3]

\pstThreeDLine[linecolor=blue, linewidth=2pt, arrows=->](0,0,0)(3,0,3)



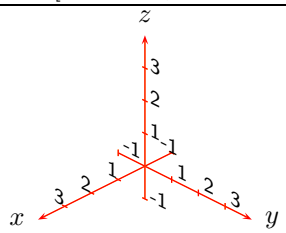
37.1.3 Option Ticks

\pstThreeDCoor[IIIDticks,IIIDticksize=.5pt]



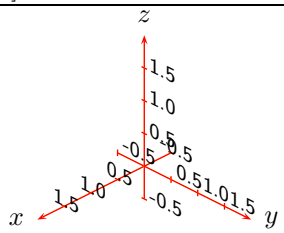
IIIDticks,IIIDticksize= .5pt

By default : IIIDticksize=0.1



IIIDticks,IIIDlabels

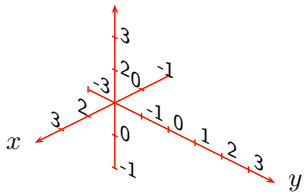
By default : IIIDlabels=false



Dx=.5,Dy=.5,Dz=.5

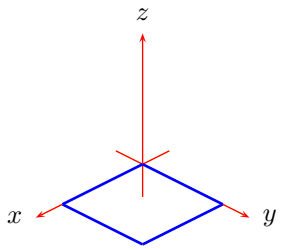
By default : Dx=Dy=Dz=1

\pstThreeDCoor[IIIDticks,IIIDlabels, yMin=-3,IIIDOffset={(1,-2,1)}]

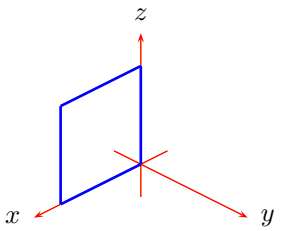


37.1.4 Option pstThreeDPlaneGrid

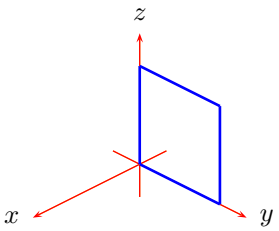
\pstThreeDPlaneGrid[planeGrid=xz](0,0)(3,3)



By default(planeGrid=xy)

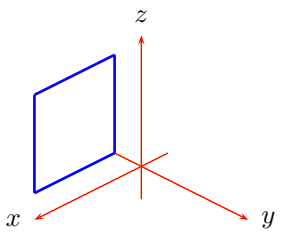


planeGrid=xz

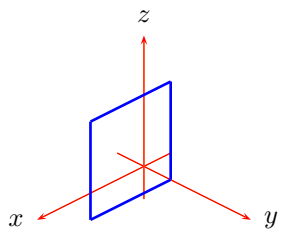


planeGrid=yz

BSpstThreeDPlaneGrid[planeGrid=xz, planeGridOffset=-1](0,0)(3,3)

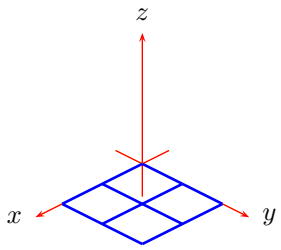


planeGridOffset=-1

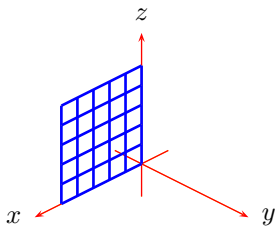


planeGridOffset=1

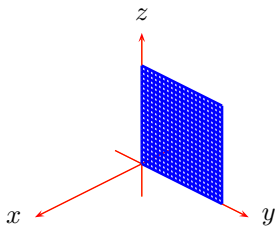
\pstThreeDPlaneGrid[planeGrid=xy,subticks=2](0,0)(3,3)



planeGrid=xy
subticks=2

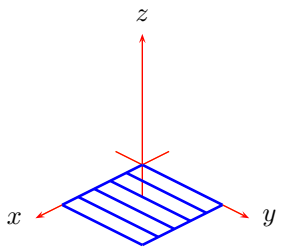


planeGrid=xz
subticks=5

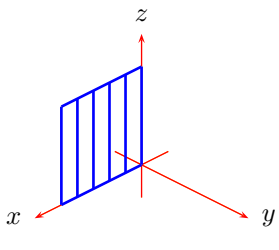


planeGrid=yz
subticks=20

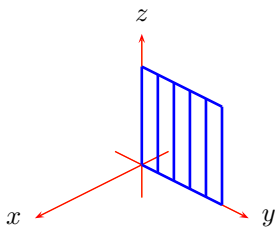
\pstThreeDPlaneGrid[planeGrid=xy,xsubticks=5](0,0)(3,3)



planeGrid=xy
xsubticks=5

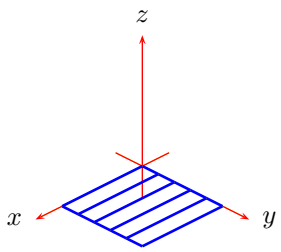


planeGrid=xz
xsubticks=5

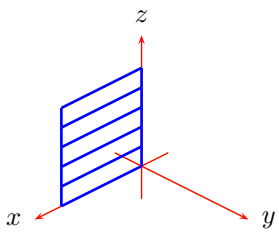


planeGrid=yz
xsubticks=5

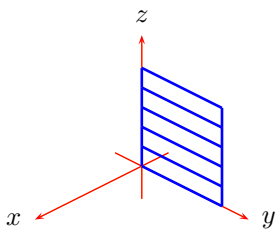
\pstThreeDPlaneGrid[planeGrid=xy,ysubticks=2](0,0)(3,3)



planeGrid=xy
ysubticks=5

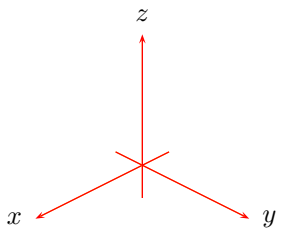
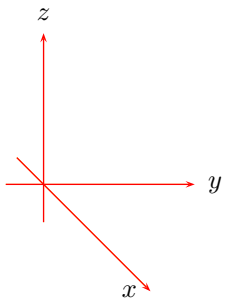
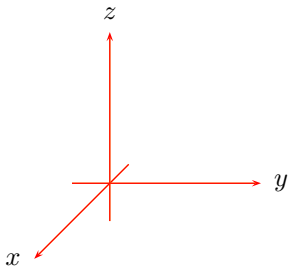
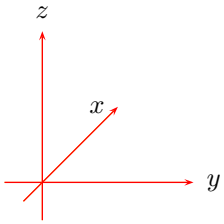
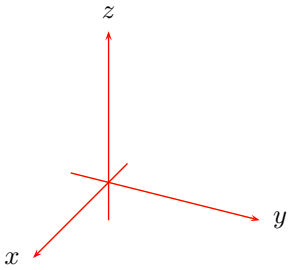


planeGrid=xz
ysubticks=5

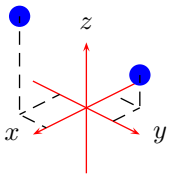


planeGrid=yz
ysubticks=5

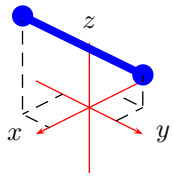
37.1.5 Option coorType

<table>
<tr><td colspan="3">\pstThreeDCoor[coorType=0]</td></tr>
<tr><td> 
</td><td> 
</td><td> 
</td></tr>
<tr><td>coorType=0</td><td>coorType=1</td><td>coorType=2</td></tr>
<tr><td> 
</td><td> 
</td><td></td></tr>
<tr><td>coorType=3</td><td>coorType=4</td><td></td></tr>
</table>

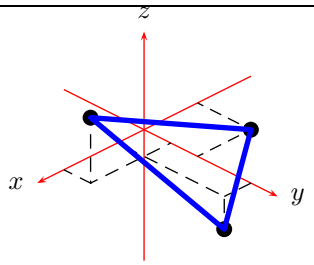
38 3D Objects



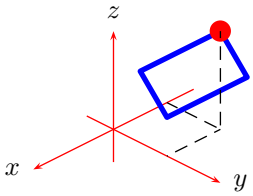
\pstThreeDDot(-1,1,1)
\pstThreeDDot(1.5,-1,3)



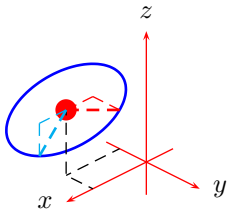
\pstThreeDLine
(-1,1,1)(1.5,-1,-1)



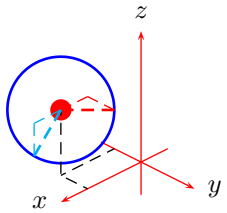
\pstThreeDTriangle
(3,1,2)(1,4,-1)(-2,2,0)



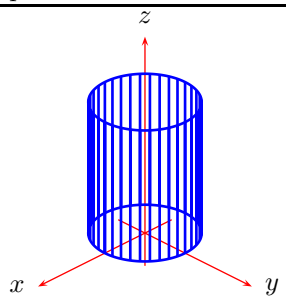
\pstThreeDSquare
(-2,2,3) (3,0,0)(0,1,-1)
position 2 vectors



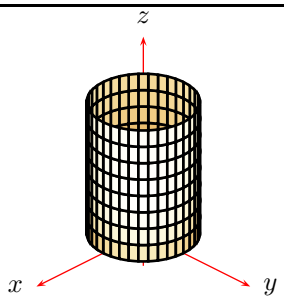
\pstThreeDEllipse
(2,-1,2) (-1,1,0)(1,0,-1)
center 2 vectors



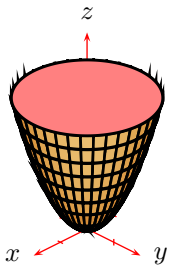
\pstThreeDCircle (1,-1,2) {2}
center 2 vectors



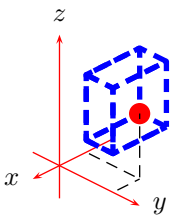
\pstIIIDCylinder{1.5}{4}



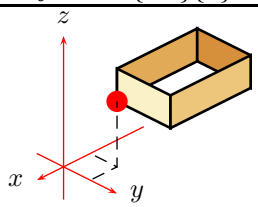
\psCylinder{1.5}{4}



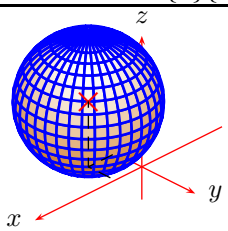
\pstParaboloid{4}{2}



\pstThreeDBox
(-1,1,2) (0,0,2)(2,0,0)(0,1,0)
position vectors X Y Z

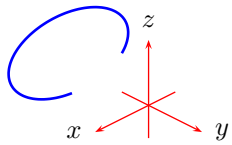
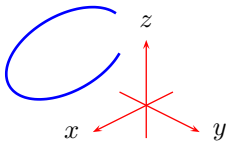
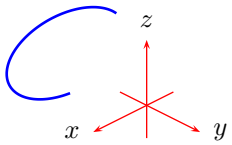


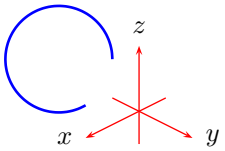
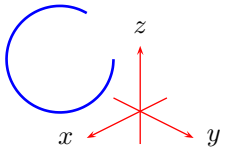
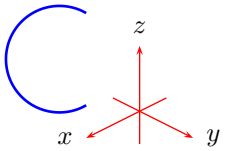
\psBox (-1,1,2) {-3}{1}{2}
position vectors X Y Z



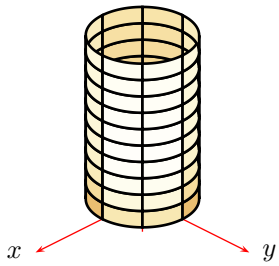
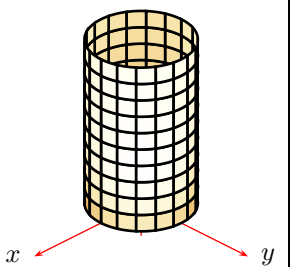
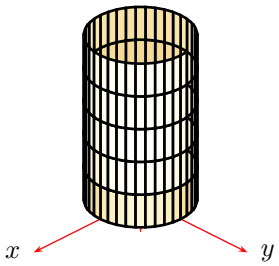
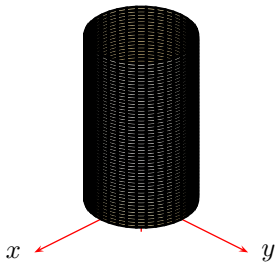
\pstThreeDSphere (1,-1,2) {2}
center radius

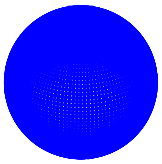
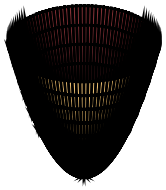
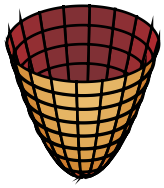
38.0.1 Portion of ellipse or circle

\pstThreeDEllipse[beginAngle=60](2,-1,2)(-1,1,0)(1,0,-1)		
		
beginAngle=60 By default : beginAngle=0	endAngle=300 By default : endAngle=360	beginAngle=60 endAngle=300

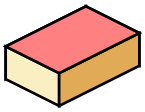
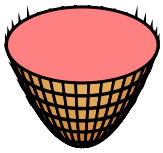
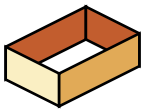
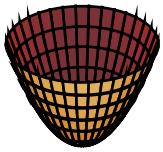
\pstThreeDCircle[endAngle=300](2,-1,2)(-1,1,0)(1,0,-1)		
		
beginAngle=60 By default : beginAngle=0	endAngle=300 By default : endAngle=360	beginAngle=60 endAngle=300

38.0.2 *increment*

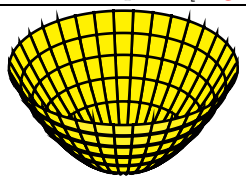
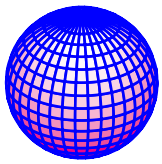
angle step		height step	
			
increment=45	increment=20	Hincrement=1	Hincrement=.1
By default : increment=.1		By default : Hincrement=0.5	

\pstThreeDSphere[increment=3](1,-1,2){2}		\pstParaboloid[increment=3](4){2}	
			
increment=3	increment=20	increment=3	increment=20
By default : increment = 10			

38.0.3 showInside

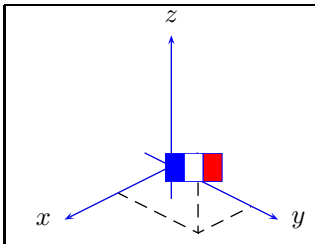
	
\psBox[showInside=false]{-3}{1}{2}	\pstParaboloid[showInside=true]{3}{2}
	
\psBox[showInside=true]{-3}{1}{2}	\pstParaboloid[showInside=false]{3}{2}

38.0.4 SegmentColor

\pstParaboloid[showInside=false, SegmentColor={[cmyk]{0 0 1 0}}]{4}{5} \pstThreeDSphere[SegmentColor={[cmyk]{0,1,0,0}}](1,-1,2){2}	
	

38.1 How to place objects in 3D picture

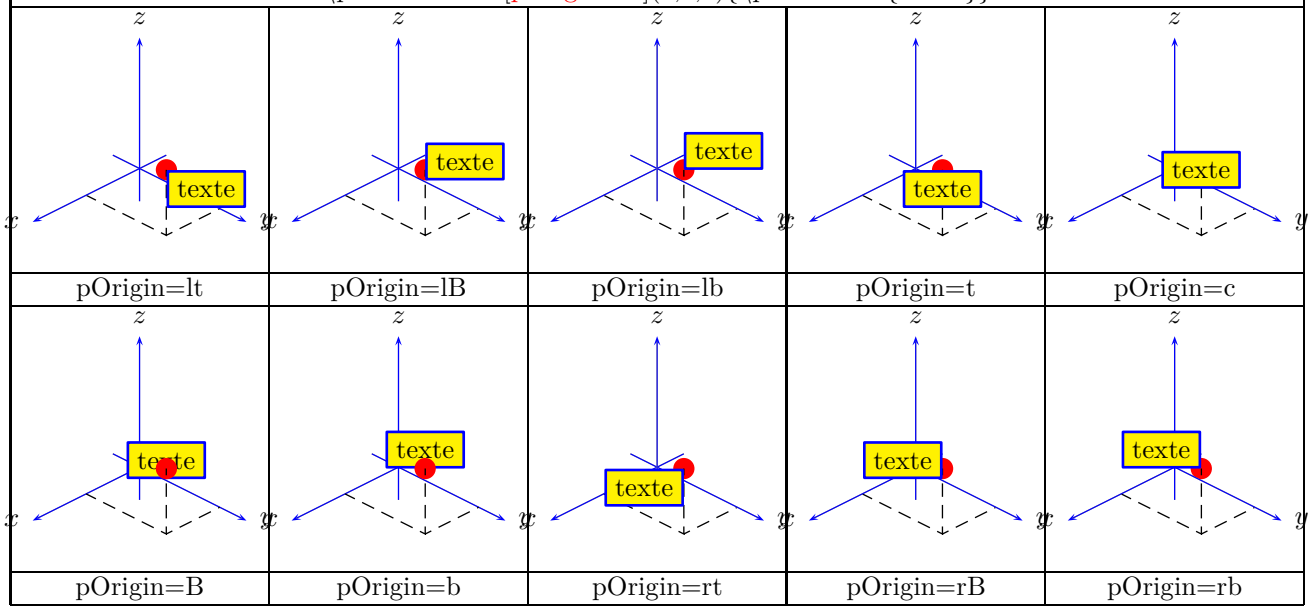
38.1.1 pstThreeDPut



\pstThreeDPut(2,3,2){\DFR}

\pstThreeDDot[drawCoor=true](2,3,2)

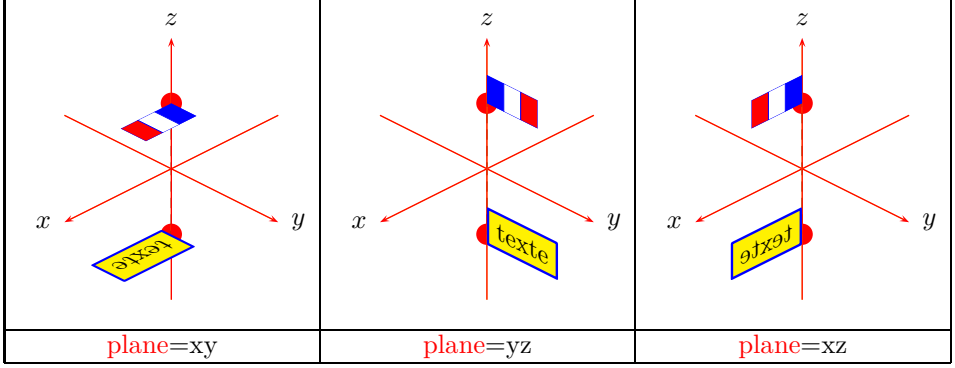
\pstThreeDPut[pOrigin=lb](2,3,2){\psframebox{ texte}}



pOrigin=lt	pOrigin=lB	pOrigin=lb	pOrigin=t	pOrigin=c
pOrigin=B	pOrigin=b	pOrigin=rt	pOrigin=rB	pOrigin=rb

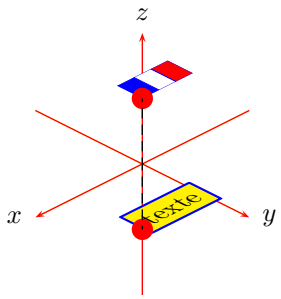
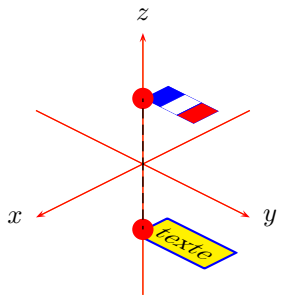
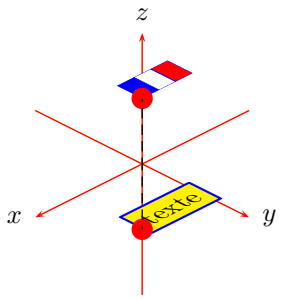
38.1.2 \pstPlanePut

\pstPlanePut[plane=xy](0,0,3){\DFR}
\pstPlanePut[plane=xy](0,0,-3){\psframebox{ texte}}



plane=xy	plane=yz	plane=xz

pstPlanePut[plane=xy,planecorr=normal](0,0,2){\DFR}
pstPlanePut[plane=xy,planecorr=normal](0,0,-2){\psframebox{texte}}

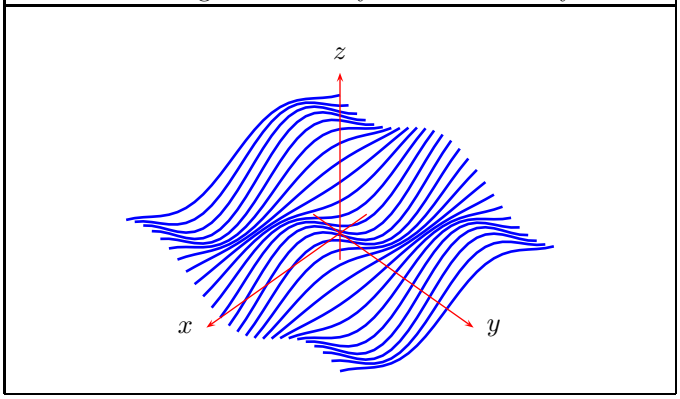
		
planecorr=normal	planecorr=xyrot	planecorr=off

38.2 3D graph

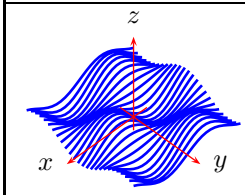
38.2.1 psplotThreeD

\psplotThreeD[algebraic] (-4,4)(-4,4) {sin(x)*cos(y)}

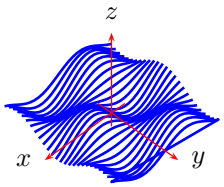
ranges for x and y — function y x



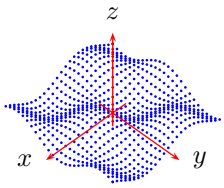
\psplotThreeD[algebraic,plotstyle=line](-4,4)(-4,4){sin(x)*cos(y)}



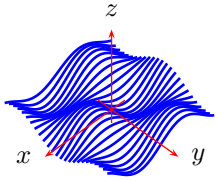
plotstyle=line



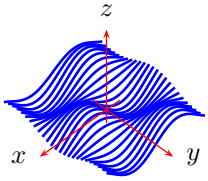
plotstyle=polygon



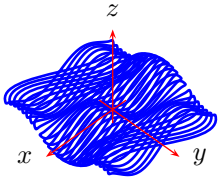
plotstyle=dots



plotstyle=curve

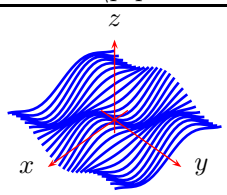


plotstyle=ecurve

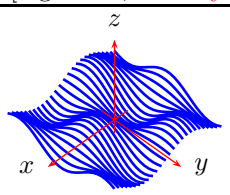


plotstyle=ccurve

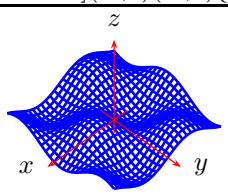
\psplotThreeD[algebraic,drawStyle=xLines](-4,4)(-4,4){sin(x)*cos(y)}



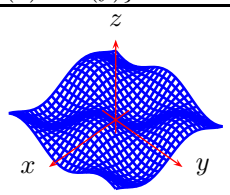
drawStyle=xLines
By default



drawStyle=yLines

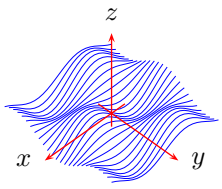


drawStyle=xyLines

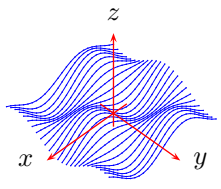


drawStyle=yxLines

\psplotThreeD[algebraic,showpoints=false,linewidth=.1pt]
(-4,4)(-4,4){sin(x)*cos(y)}



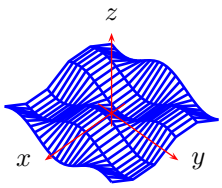
showpoints=false



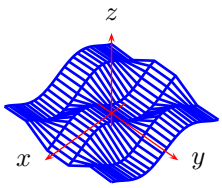
showpoints=true

By default

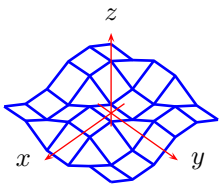
\psplotThreeD[algebraic,xPlotpoints=5,drawStyle=xyLines](-4,4)(-4,4){sin(x)*cos(y)}



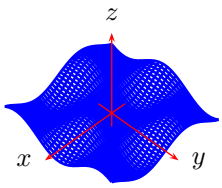
xPlotpoints=5



yPlotpoints=5



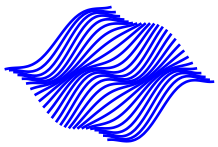
yPlotpoints=5
yPlotpoints=5



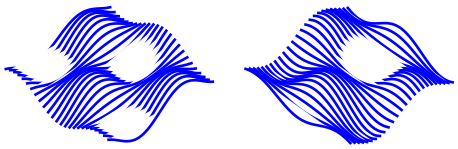
xPlotpoints=50

By default : xPlotpoints=25 yPlotpoints=25

\psplotThreeD[algebraic,hiddenLine=false](-4,4)(-4,4){sin(x)*cos(y)}



hiddenLine=false



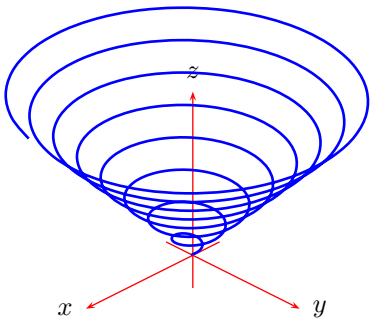
hiddenLines=true

By default

38.2.2 parametricplotThreeD

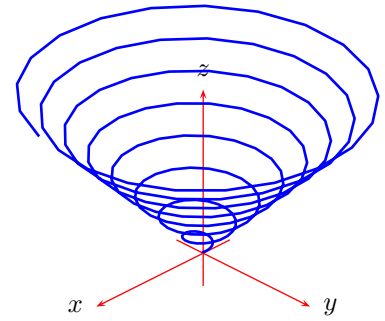
\parametricplotThreeD[xPlotpoints=200,plotstyle=curve,algebraic]
(0,50) { t/10*cos(t) | t/10*sin(t) | t/10}

range for t 3 parametric functions



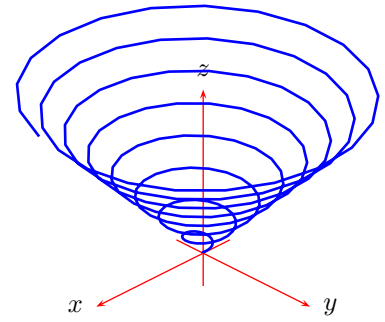
38.3 3D graph from a data file

38.3.1 fileplotThreeD



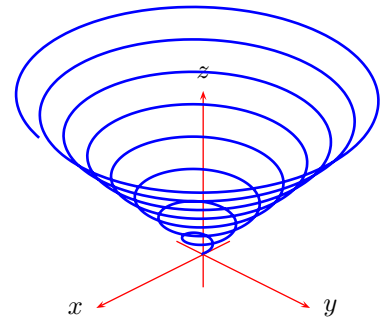

```
\fileplotThreeD{data3d.txt}

% data3d.txt : data file created with Excel
```

38.3.2 dataplotThreeD




```
\readdata{\data}{data3d.txt}

% data3d.txt : data file created with Excel

\dataplotThreeD[plotstyle=line]{\data}
```

38.3.3 listplotThreeD

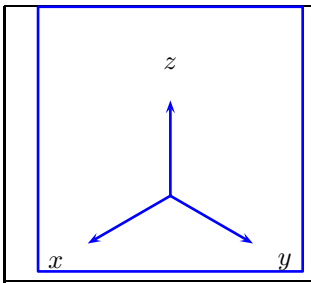



```
\readdata{\data}{data3d.txt}

% data3d.txt : data file created with Excel

\listplotThreeD[plotstyle=curve]{\data}
```

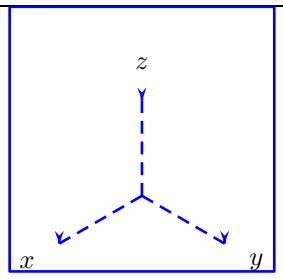
39 3D solid

Utilisation du module **pst-solides3d**
Cette partie sera complétée dans uns version ultérieure

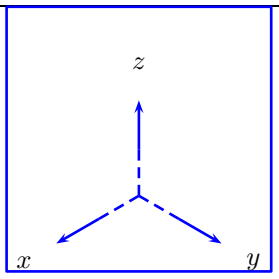
39.1 Axes



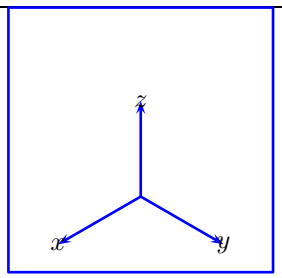
axesIIID(0,0,0)(2,2,2)



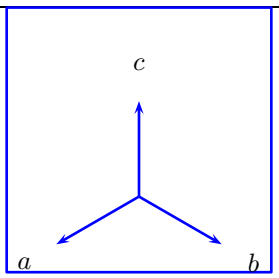
axesIIID(2,2,2)(2,2,2)



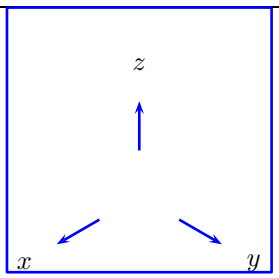
axesIIID(1,1,1)(2,2,2)



labelsep=0cm
By default : labelsep=5pt



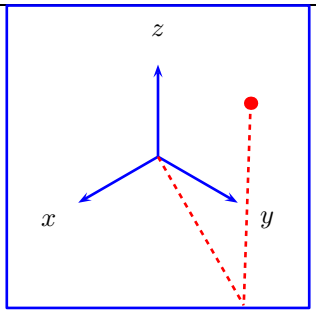
axisnames={a,b,c}
By default : axisnames={x,y,z}



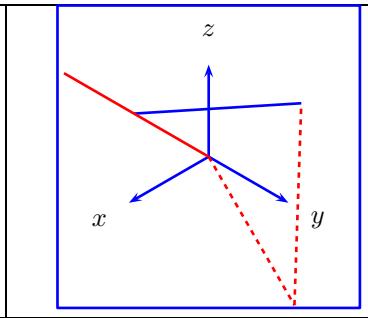
showOrigin=false
By default : showOrigin=true

39.2 3D elements

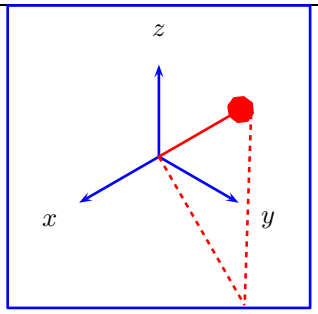
39.2.1 point, line, vector



[object=point,args=1 2 2]



[object=line,args=0 -1 0 1 2 2]

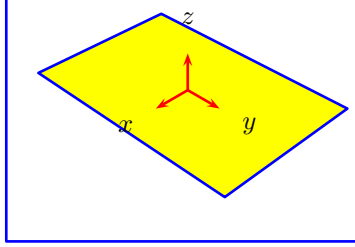


[object=vecteur,args=1 2 2]

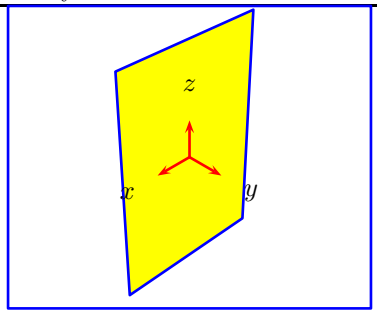
39.2.2 Plane

\psSolid[object=plan,definition=equation,args= {[0 0 1 0]},base=-2 2 -3 3]

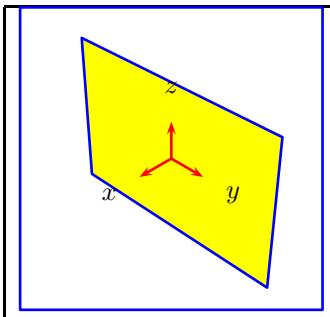
coeff de l'équation ax+by+cz+d = 0



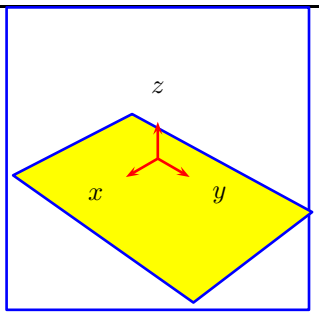
args={[0 0 1 0]}



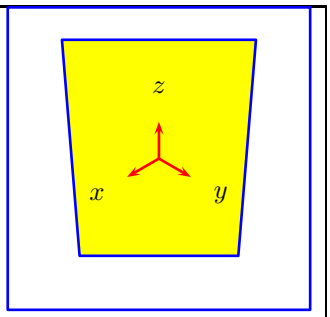
args={[0 1 0 0]}



args=[1 0 0 0]



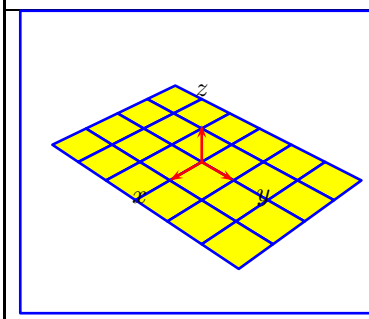
args=[0 0 1 1]



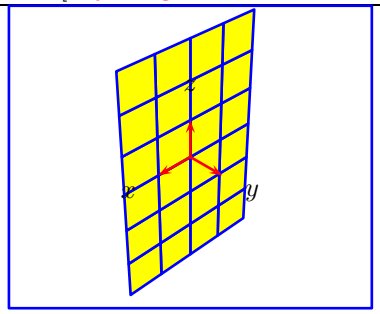
args=[1 1 0 0]

39.2.3 Grid

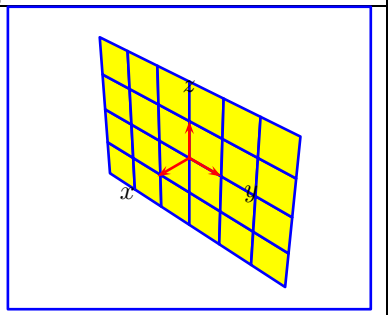
\psSolid[object=grille,base=-2 2 -3 3]



By default



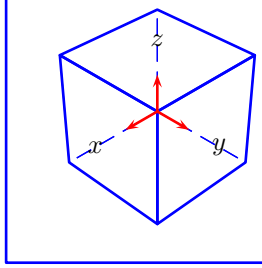
RotX=90



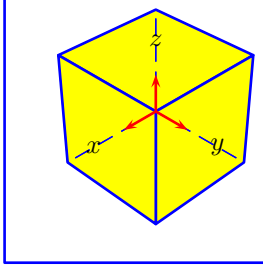
RotY=90

39.2.4 cube

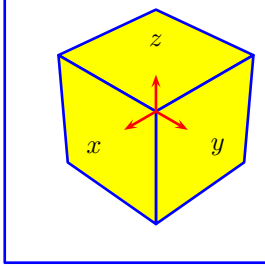
\psSolid[object=cube,a=3,action=draw]



action=draw



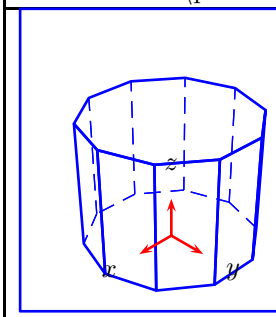
action=draw*



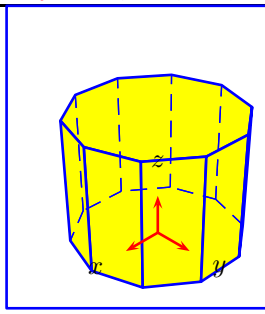
action=draw**

39.2.5 Cylinder

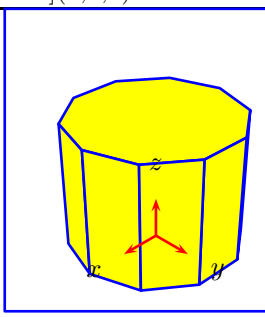
\psSolid[object=cylindre,h=3,r=2,action=draw](0,0,0)



action=draw



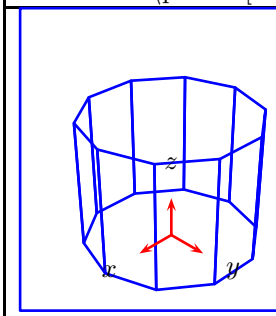
action=draw*



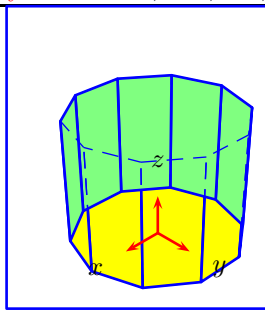
action=draw**

39.2.6 Tube

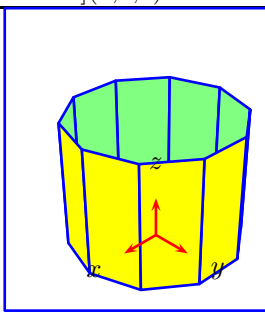
\psSolid[object=cylindrecreux,h=3,r=2,action=draw](0,0,0)



action=draw



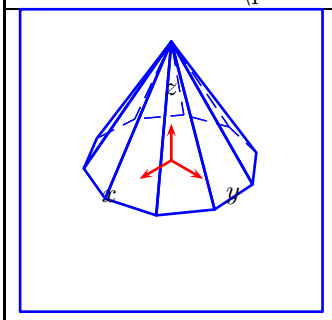
action=draw*



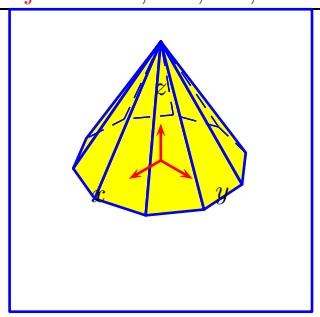
action=draw**

39.2.7 Cone

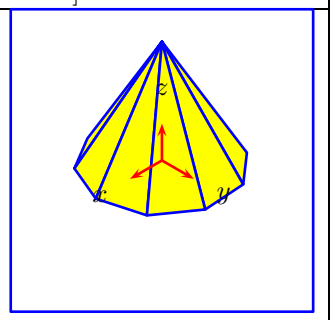
\psSolid[object=cone,h=3,r=2,action=draw]



action=draw



action=draw*

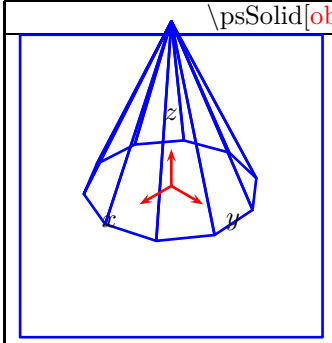


action=draw**

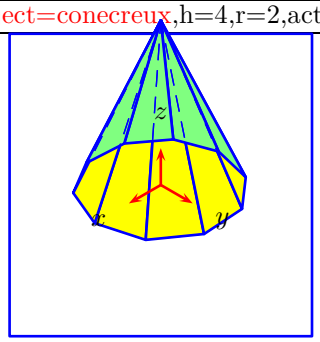
39.2.8 conecreux

39.2.9 Empty cone

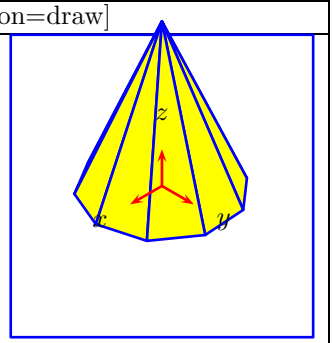
\psSolid[object=conecreux,h=4,r=2,action=draw]



action=draw



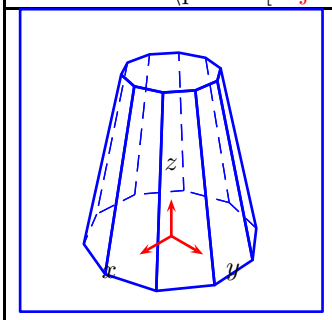
action=draw*



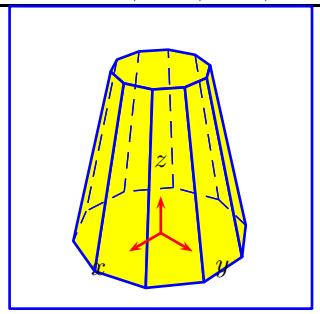
action=draw**

39.2.10 Truncated cone

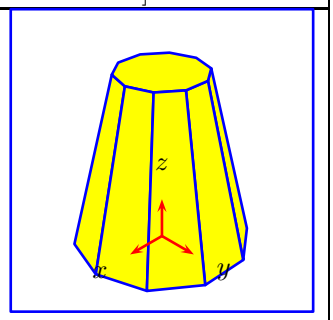
\psSolid[object=tronccone,r0=2,r1=1,h=4,action=draw]



action=draw



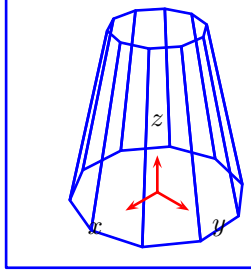
action=draw*



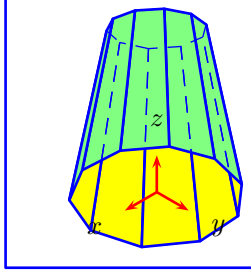
action=draw**

39.2.11 Empty truncated cone

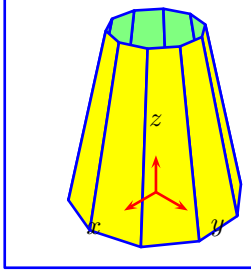
\psSolid[object=troncconecreux,r0=2,r1=1,h=4,action=draw]



action=draw



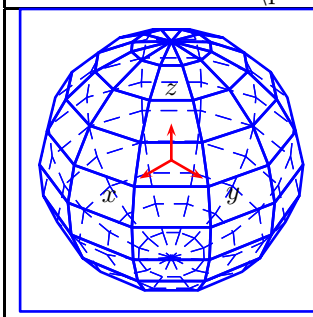
action=draw*



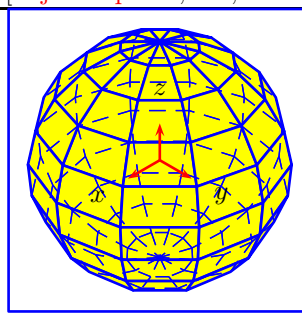
action=draw**

39.2.12 sphere

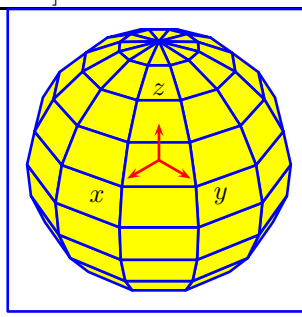
\psSolid[object=sphere,r=1,action=draw]



action=draw



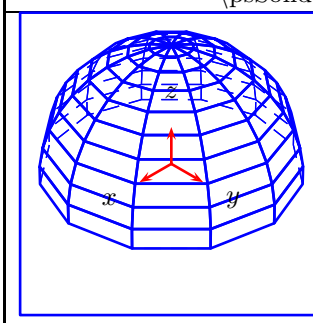
action=draw*



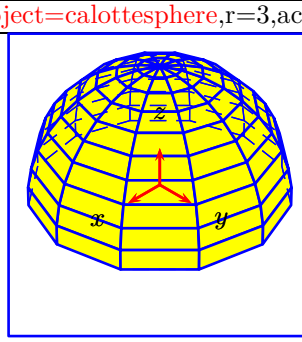
action=draw**

39.2.13 Spherical cup

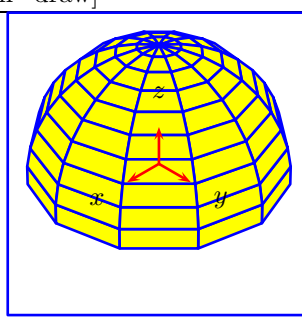
\psSolid[object=calottesphere,r=3,action=draw]



action=draw



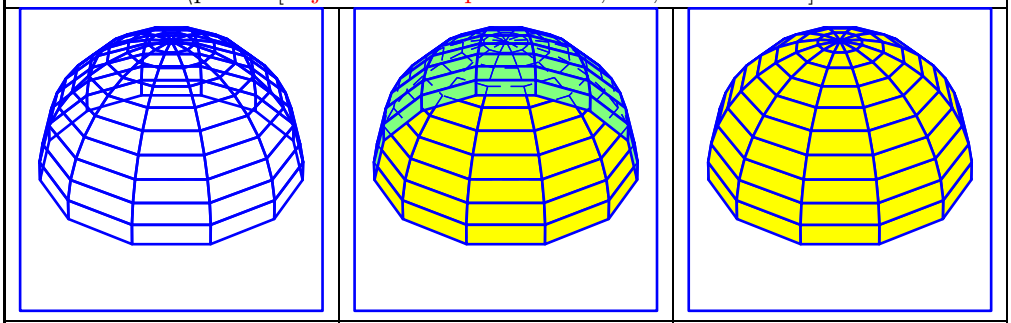
action=draw*



action=draw**

39.2.14 empty spherical cup

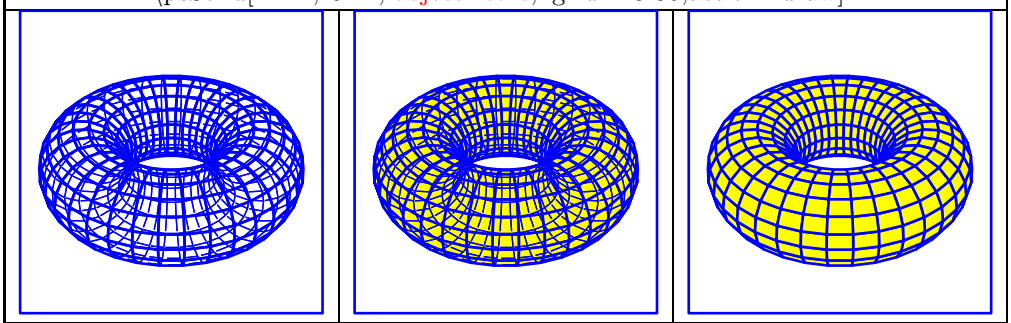
\psSolid[object=calottespherecreuse,r=3,action=draw]



action=draw	action=draw*	action=draw**

39.2.15 Torus

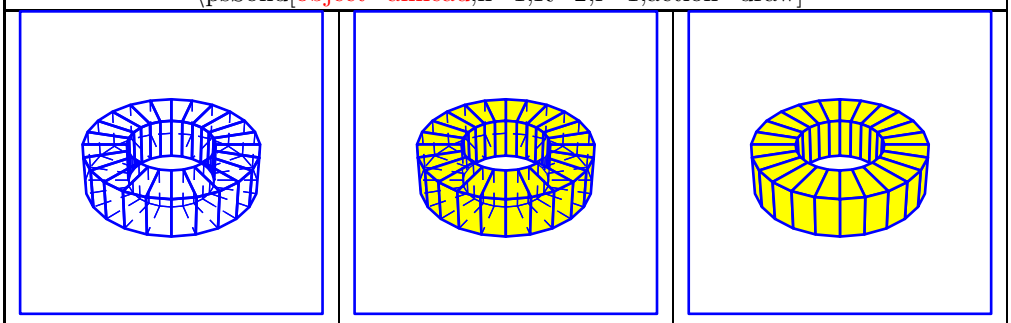
\psSolid[r1=2,r0=1, object=tore,ngrid=18 36,action=draw]



action=draw	action=draw*	action=draw**

39.2.16 Ring

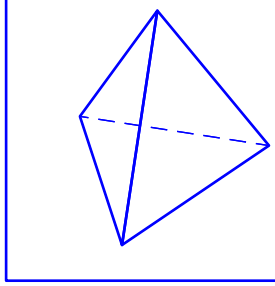
\psSolid[object=anneau,h=1,R=2,r=1,action=draw]



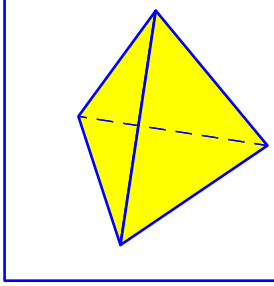
action=draw	action=draw*	action=draw**

39.2.17 tetrahedron

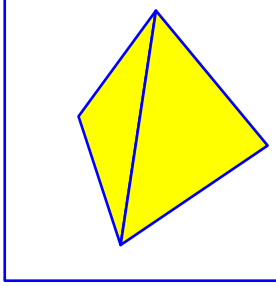
\psSolid[object=tetrahedron,r=1,RotZ=30,action=draw]



action=draw



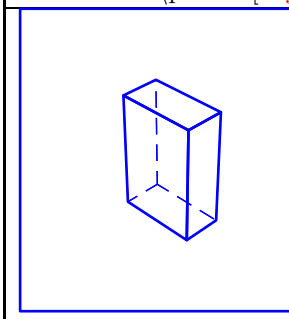
action=draw*



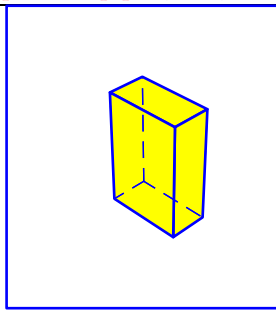
action=draw**

39.2.18 parallelepiped

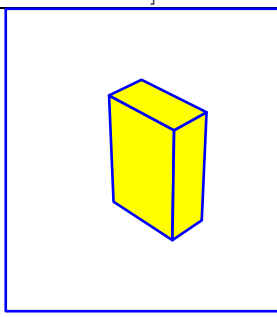
\psSolid[object=parallelepiped,a=1,b=2,c=3,action=draw]



action=draw



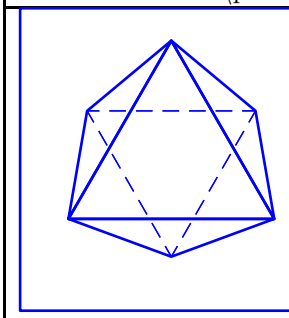
action=draw*



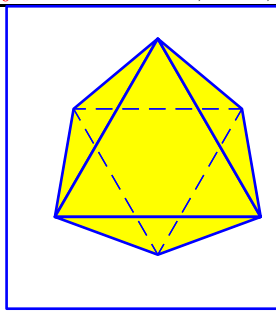
action=draw**

39.2.19 octahedron

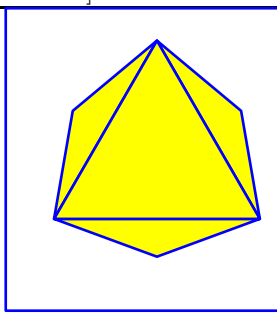
\psSolid[object=octahedron,a=30,action=draw]



action=draw



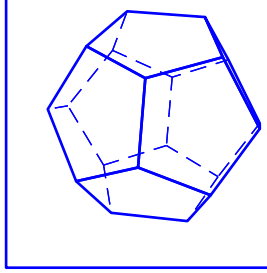
action=draw*



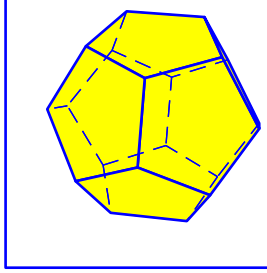
action=draw**

39.2.20 dodecahedron

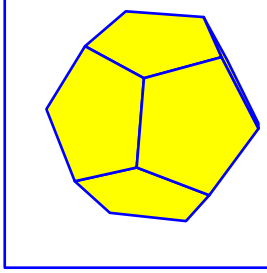
\psSolid[object=dodecahedron,a=2.5,RotZ=90,action=draw]



action=draw



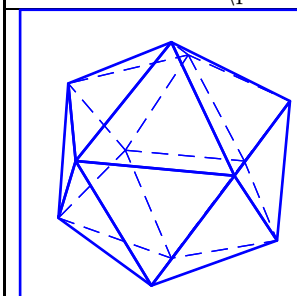
action=draw*



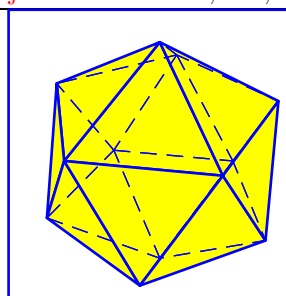
action=draw**

39.2.21 icosahedron

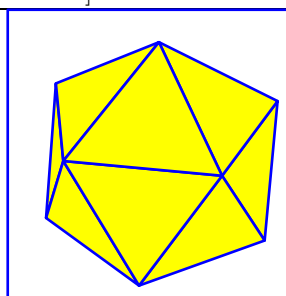
\psSolid[object=icosahedron,a=3,action=draw]



action=draw



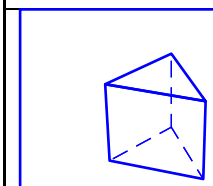
action=draw*



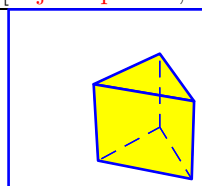
action=draw**

39.2.22 prism

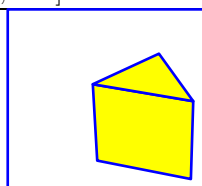
\psSolid[object=prisme,action=draw,h=4]



action=draw



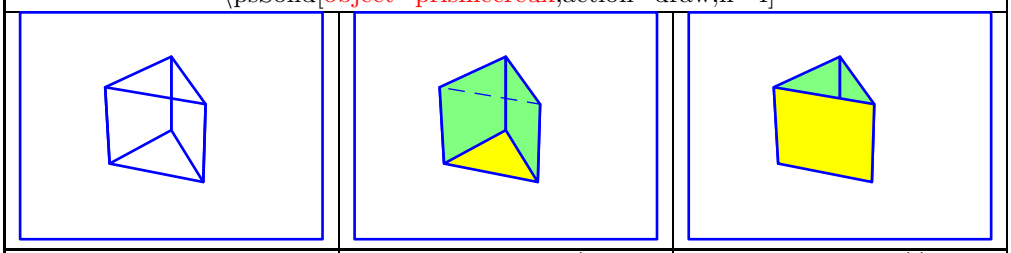
action=draw*



action=draw**

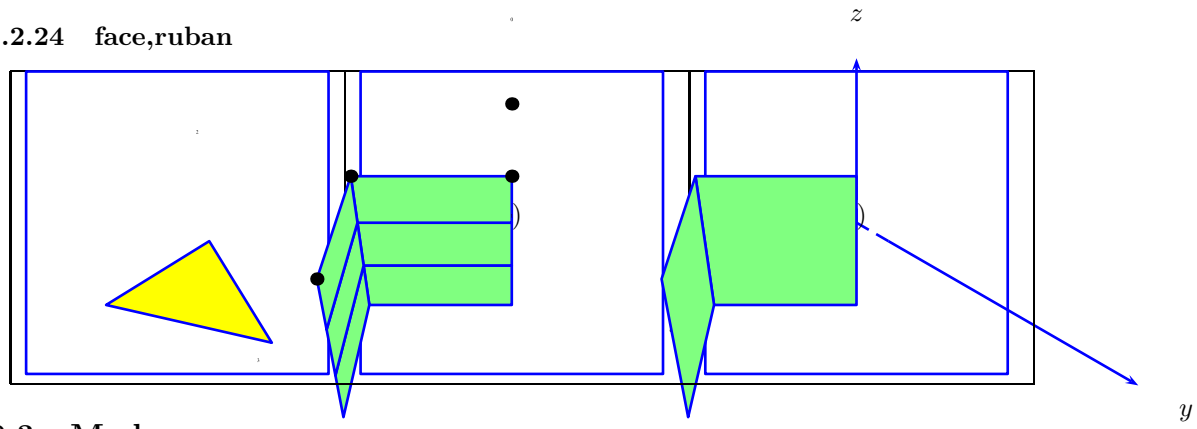
39.2.23 Empty prism

\psSolid[object=prismecreux,action=draw,h=4]



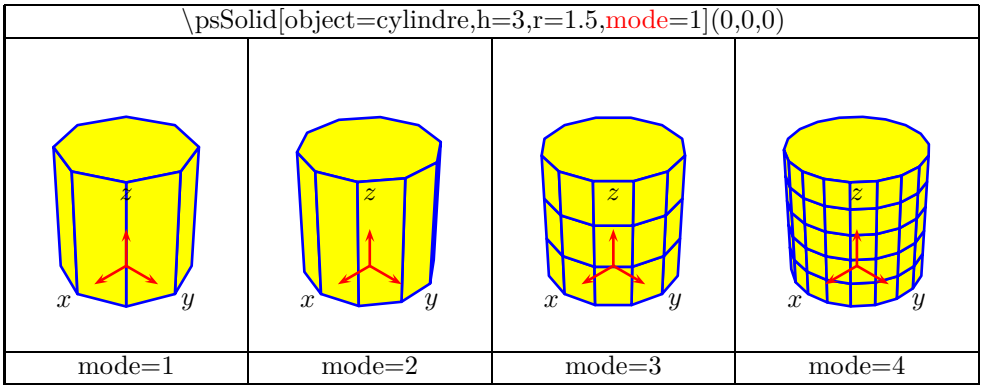
action=draw	action=draw*	action=draw**

39.2.24 face,ruban



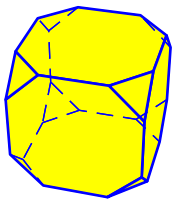
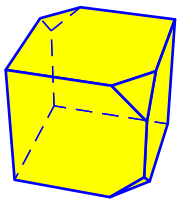
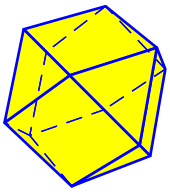
39.3 Mode

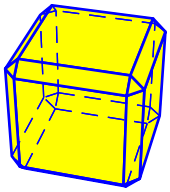
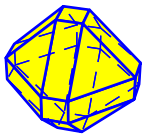
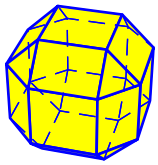
\psSolid[object=cylindre,h=3,r=1.5,mode=1](0,0,0)

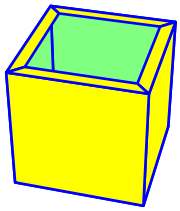
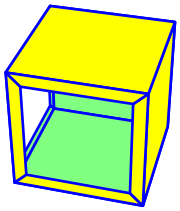
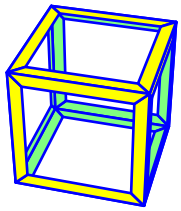


mode=1	mode=2	mode=3	mode=4

39.3.1 Options

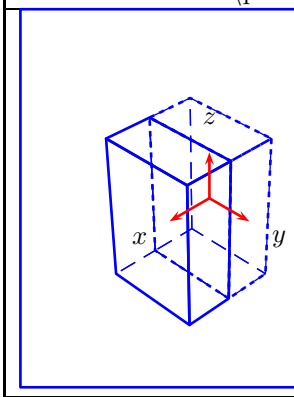
\psSolid[object=cube,a=3,action=draw*,trunc=all,RotZ=30]		
		
trunc=all	trunc=0 2 4	trunccoeff=.5

\psSolid[object=cube,a=3,action=draw,chanfrein,RotZ=30]		
		
chanfrein	chanfrein,chanfreincoeff=.2	chanfrein,chanfreincoeff=.5

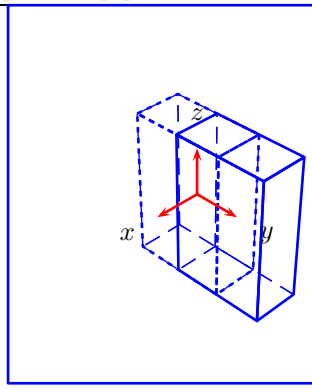
\psSolid[object=cube,a=3,action=draw**,hollow,affinage=0,RotZ=30]		
		
hollow ,affinage=3	hollow,,affinage=3 4	hollow,affinage=all

39.4 Positionnement

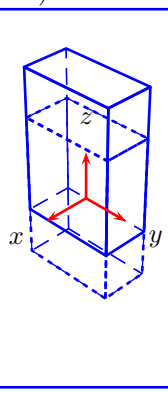
\psSolid[object=parallelepiped,a=1,b=2,c=3,action=draw](1 0 0)



(1 0 0)

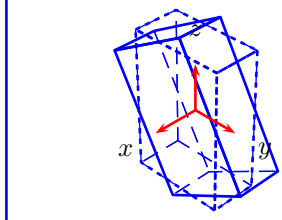


(0 1 0)

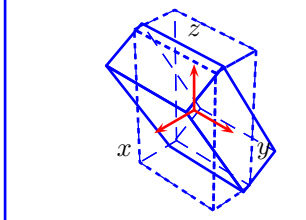


(0 0 1)

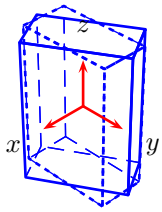
\psSolid[object=parallelepiped,a=1,b=2,c=3,action=draw]



RotX=30



RotY=30

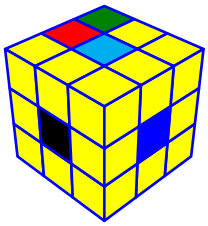


RotZ=30

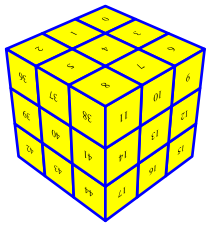
39.5 c

oloring and numbering

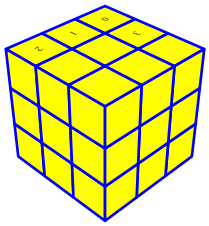
\psSolid[fcol=0 (green) 1 (red) 4 (cyan) 13 (blue) 40 (black), object=cube,mode=3]



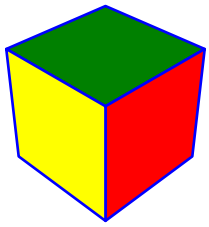
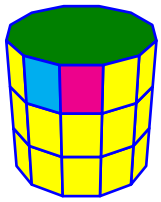
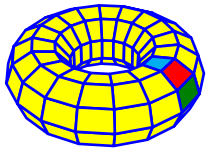
fcol=0 (green) 1 (red) ...



numfaces=all

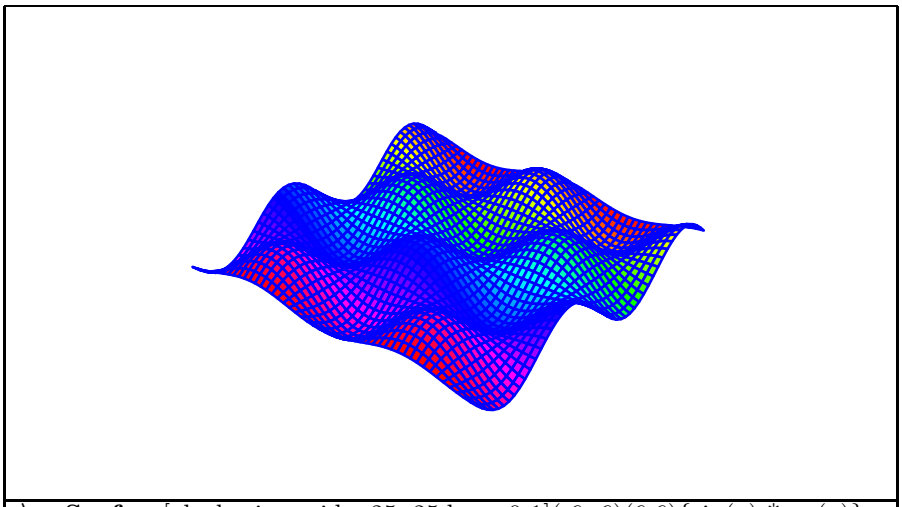


numfaces=0 1 2 3

\psSolid[fcol=0 (green) 1 (red) 2 (cyan) 3 (magenta), object=parallelepiped,mode=3]		
		
fcol= 0 (green) 1 (red) ...	numfaces=all	numfaces=0 1

39.6 In a future version

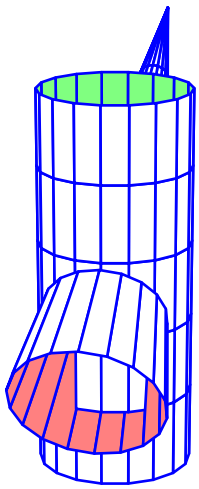
39.6.1 Equation define surface



psSurface[algebraic,ngrid=.25 .25,hue=0 1](-6,-6)(6,6){sin(x) *cos(y)}

39.6.2 F

usion of two solids



psset{solidmemory}

\psSolid[object=cylindrecreux,h=10,r=2,fillcolor=white,mode=4,name=A1,incolor=green!50](0,0,-3)
\psSolid[object=conecreux,h=15,r=2,RotY=-60,fillcolor=white,incolor=red!50,mode=5,name=B1](4,0,0)
\psSolid[object=fusion,action=draw**,base=A1 B1,](0,0,0)
composeSolid

A Formula in postcript

formule	en PostScript	valeur
$2+3$	2 3 add	5
$2+2$	2 dup add	4
$2-3$	2 -3 add	-1
$2*3$	2 3 mul	6
$10/2$	10 2 div	5.0
3^2	3 2 exp	9.0
$\sqrt{3}$	3 sqrt	1.73
$\sin(30)$	30 sin	0.5
$\cos(30)$	30 cos	0.86
$sin^2(30)$	30 sin 2 exp	0.25
$sin(5^2)$	5 2 exp sin	0.42

B Packages studied in this document

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C Sources

Références

[1] pst-user.pdf version 1.51 131 pages

[2] pstricks-add-doc.pdf version 3.61 134 pages

[3] pst-3dplot-doc.pdf version 1.94 69 pages

[4] pst-bezier-doc.pdf version 0.01 10 pages

[5] pst-coil-doc.pdf version 1.06 14 pages

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