pst-node

plotting data and mathematical functions*

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Abstract

This version of pst-node includes all the macros which were for testing part of the pstricks-add-package. This documentation shows only these extensions. For the other macros have a look into the old PSTricks documentation.

pst-node uses the extended version of the keyval package. So be sure, that you have installed pst-xkey which is part of the xkeyval-package and that all packages, that uses the old keyval interface are loaded before the xkeyval.

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	*This document was written with Kile: 1.7 (Qt: 3.1.1; KDE:	

^{*}This document was written with Kile: 1.7 (Qt: 3.1.1; KDE: 3.3; http://sourceforge.net/projects/kile/) and the PDF output was build with VTeX/Free (http://www.micropress-inc.com/linux)

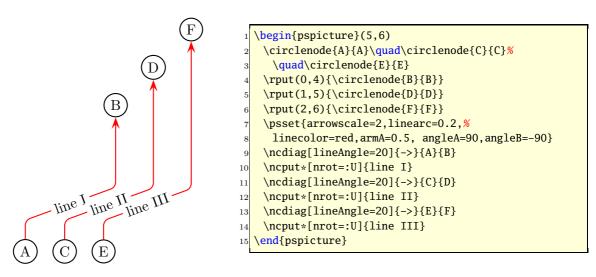
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1 \ncdiag and \pcdiag

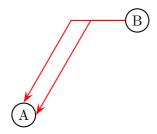
With the new option lineAngle the lines drawn by the ncdiag macro can now have a specified gradient. Without this option one has to define the two arms (which maybe zero) and PSTricks draws the connection between them. Now there is only a static armA, the second one armB is calculated when an angle lineAngle is defined. This angle is the gradient of the intermediate line between the two arms. The syntax of ncdiag is

```
\ncdiag[<options>]{<Node A>}{<Node B>}
\pcdiag[<options>](<Node A>)(<Node B>)
```

name	meaning
lineAngle	angle of the intermediate line segment. Default is 0, which is
	the same than using ncdiag without the lineAngle option.



The ncdiag macro sets the armB dynamically to the calculated value. Any user setting of armB is overwritten by the macro. The armA could be set to a zero length:



```
begin{pspicture}(4,3)

rput(0.5,0.5){\circlenode{A}{A}}

rput(3.5,3){\circlenode{B}{B}}

{\pset{linecolor=red,arrows=<-,arrowscale=2}}

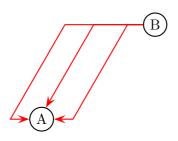
ncdiag[lineAngle=60,%

armA=0,angleA=0,angleB=180]{A}{B}

ncdiag[lineAngle=60,%

armA=0,angleA=90,angleB=180]{A}{B}}

end{pspicture}</pre>
```



```
begin{pspicture}(4,3)
    \rput(1,0.5){\circlenode{A}{A}}

rput(4,3){\circlenode{B}{B}}

{\rput(4,3){\circlenode{B}{B}}}

{\psset{linecolor=red,arrows=<-,arrowscale=2}}

ncdiag[lineAngle=60,%

armA=0.5,angleA=0,angleB=180]{A}{B}

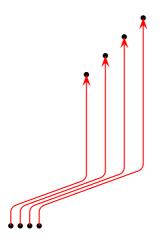
ncdiag[lineAngle=60,%

armA=0,angleA=70,angleB=180]{A}{B}}

ncdiag[lineAngle=60,%

armA=0.5,angleA=180,angleB=180]{A}{B}}

end{pspicture}</pre>
```



```
\begin{pspicture}(4,5.5)
    \cnode*(0,0){2pt}{A}%
    \cnode*(0.25,0){2pt}{C}%
    \cnode*(0.5,0){2pt}{E}%
   \cnode*(0.75,0){2pt}{G}%
   \cnode*(2,4){2pt}{B}%
   \cnode*(2.5,4.5){2pt}{D}%
   \cnode*(3,5){2pt}{F}%
   \cnode*(3.5,5.5){2pt}{H}%
   {\psset{arrowscale=2,linearc=0.2,%
     linecolor=red,armA=0.5, angleA=90,angleB=-90}
   \pcdiag[lineAngle=20]{->}(A)(B)
13
   \pcdiag[lineAngle=20]{->}(C)(D)
   \proonup = 20 = 20 = 0 
   \pcdiag[lineAngle=20]{->}(G)(H)}
  \end{pspicture}
```

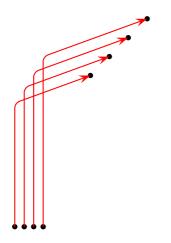
2 \ncdiagg and \pcdiagg

This is nearly the same than \ncdiag except that armB=0 and the angleB value is computed by the macro, so that the line ends at the node with an angle like a \pcdiagg line. The syntax of ncdiagg/pcdiagg is

```
\ncdiag[<options>]{<Node A>}{<Node B>}
\pcdiag[<options>](<Node A>)(<Node B>)
```

```
E line II B III B
```

```
\begin{pspicture}(4,6)
 \psset{linecolor=black}
 \circlenode{A}{A}%
 \quad\circlenode{C}{C}%
 \quad\circlenode{E}{E}
 \rput(0,4){\circlenode{B}{B}}}
 \rput(1,5){\circlenode{D}{D}}
 \rput(2,6){\circlenode{F}{F}}
 {\psset{arrowscale=2,linearc=0.2,linecolor=red,armA
   =0.5, angleA=90}
 \ncdiagg[lineAngle=-160]{->}{A}{B}
 \ncput*[nrot=:U]{line I}
 \ncdiagg[lineAngle=-160]{->}{C}{D}
 \ncput*[nrot=:U]{line II}
 \label{lineAngle} $$ \c = -160]{->}{E}{F}
 \ncput*[nrot=:U]{line III}}
\end{pspicture}
```



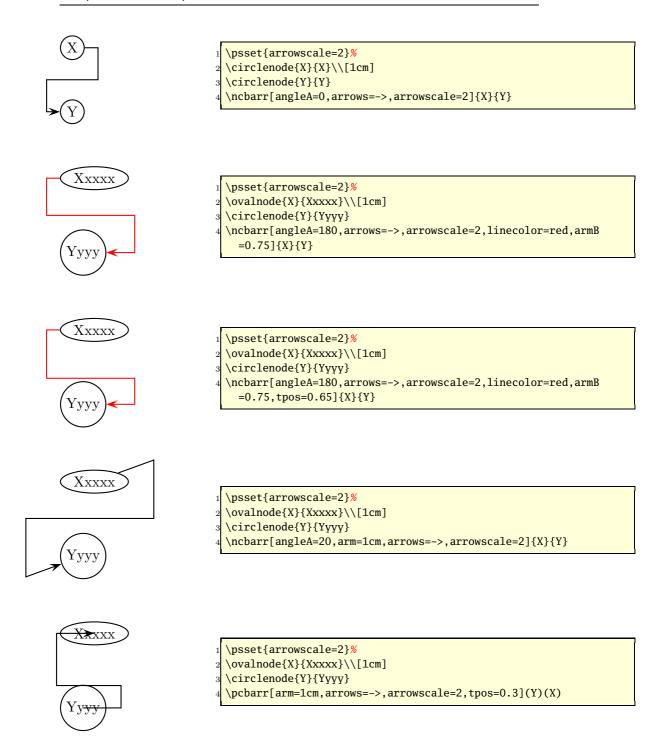
```
\begin{pspicture}(4,6)
 \psset{linecolor=black}
 \cnode*(0,0){2pt}{A}%
 \cnode*(0.25,0){2pt}{C}%
 \cnode*(0.5,0){2pt}{E}%
 \cnode*(0.75,0){2pt}{G}%
 \cnode*(2,4){2pt}{B}%
 \cnode*(2.5,4.5){2pt}{D}%
 \cnode*(3,5){2pt}{F}%
 \cnode*(3.5,5.5){2pt}{H}%
 {\psset{arrowscale=2,linearc=0.2,linecolor=red,armA
   =0.5, angleA=90}
 \pcdiagg[lineAngle=20]{->}(A)(B)
 \pcdiagg[lineAngle=20]{->}(C)(D)
 \pcdiagg[lineAngle=20]{->}(E)(F)
 \pcdiagg[lineAngle=20]{->}(G)(H)}
\end{pspicture}
```

The only catch for \ncdiagg is, that you need the right value for lineAngle. If the node connection is on the wrong side of the second node, then choose the corresponding angle, e.g.: if 20 is wrong then take -160, the corresponding to 180.

```
\begin{pspicture}(4,1.5)
         \circlenode{a}{A}
         \rput[1](3,1){\rnode{b}{H}}
Η
         \ncdiagg[lineAngle=60,angleA=180,armA=.5,nodesepA=3pt,
           linecolor=blue]{b}{a}
        \end{pspicture}
        \begin{pspicture}(4,1.5)
         \circlenode{a}{A}
         \rput[1](3,1){\rnode{b}{H}}
         \ncdiagg[lineAngle=60,armA=.5,nodesepB=3pt,linecolor=blue]{a
        \end{pspicture}
        \begin{pspicture}(4,1.5)
         \circlenode{a}{A}
         \rput[1](3,1){\rnode{b}{H}}
Η
         \ncdiagg[lineAngle=-120,armA=.5,nodesepB=3pt,linecolor=blue
           ]{a}{b}
        \end{pspicture}
```

3 \ncbarr und \pcbarr

This has the same behaviour as ncbar, but has 5 segments and all are horizontal ones. This is the reason why angleA should be 0° or alternative 180° . Other values are possible but don't make really sense. AngleB is in geenral AngleA180+ and cannot be set to another value. The intermediate horizontal line is symmetrical to the distance of the two nodes and can be set with the option tpos $(0 \le tpos \le 1)$.



4 \psRelLine

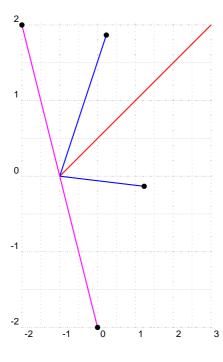
With this macro it is possible to plot lines relative to a given one. Parameter are the angle and the length factor:

```
\psRelLine(<P0>)(<P1>){<length factor>}{<end node name>}
\psRelLine{<arrows>}(<P0>)(<P1>){<length factor>}{<end node name>}
\psRelLine[<options>](<P0>)(<P1>){<length factor>}{<end node name>}
\psRelLine[<options>]{<arrows>}(<P0>)(<P1>){<length factor>}{<end node name>}
```

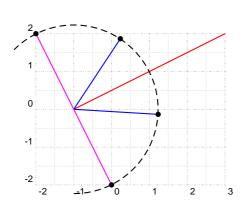
The length factor depends to the distance of $\overline{P_0P_1}$ and the end node name must be a valid nodename and shouldn't contain any of the special PostScript characters. There are two valid options:

name	default	meaning
angle	0	angle between the given line $\overline{P_0P_1}$ and the new one
		$\overline{P_0P_endNode}$
trueAngle	false	defines whether the angle depends to the seen line
		or to the mathematical one, which respect the scal-
		ing factors xunit and yunit.

The following two figures show the same, the first one with a scaling different to 1:1, this is the reason why the end points are on an ellipse and not on a circle like in the second figure.

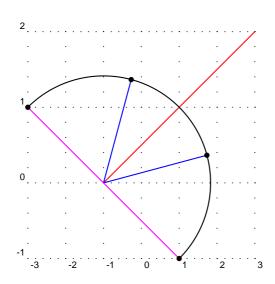


```
\psset{yunit=2,xunit=1}
\begin{array}{c} \begin{array}{c} \mathbf{begin} & (-2,-2)(3,2) \end{array} \end{array}
\psgrid[subgriddiv=2,subgriddots=10,gridcolor=
  lightgray]
\poonup (-1,0){A}\poonup (3,2){B}
\psline[linecolor=red](A)(B)
\psRelLine[linecolor=blue,angle=30](-1,0)(B){0.5}{
  EndNode}
\qdisk(EndNode){2pt}
\psRelLine[linecolor=blue,angle=-30](A)(B){0.5}{
  EndNode}
\qdisk(EndNode){2pt}
\psRelLine[linecolor=magenta,angle=90](-1,0)(3,2)
  {0.5}{EndNode}
\qdisk(EndNode){2pt}
\psRelLine[linecolor=magenta,angle=-90](A)(B){0.5}{
  EndNode}
\qdisk(EndNode){2pt}
\end{pspicture}
```



```
\begin{array}{l} \mathbf{begin} & (-2,-2)(3,2) \end{array}
 \psgrid[subgriddiv=2,subgriddots=10,gridcolor=
          lightgray]
 \poonup (-1,0){A}\poonup (3,2){B}
  \psline[linecolor=red](A)(B)
 \prootember \pro
  \psRelLine[linecolor=blue,angle=30](-1,0)(B){0.5}{
  \qdisk(EndNode){2pt}
   \psRelLine[linecolor=blue,angle=-30](A)(B){0.5}{
          EndNode}
 \qdisk(EndNode){2pt}
\psRelLine[linecolor=magenta,angle=90](-1,0)(3,2)
            {0.5}{EndNode}
\qdisk(EndNode){2pt}
\psRelLine[linecolor=magenta,angle=-90](A)(B){0.5}{
          EndNode}
\qdisk(EndNode){2pt}
\end{pspicture}
```

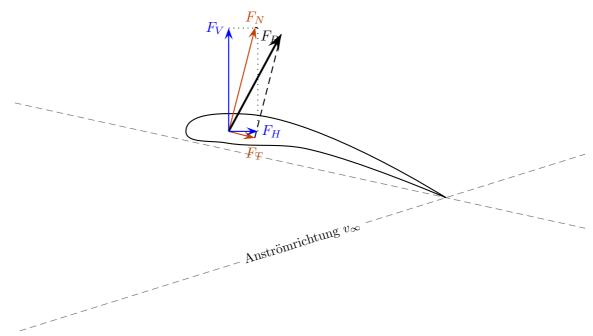
The following figure has also a different scaling, but has set the option trueAngle, all angles depends to what "you see".



```
\psset{yunit=2,xunit=1}
  \begin{pspicture}(-3,-1)(3,2)\psgrid[
    subgridcolor=lightgray]
  \poonup (-1,0){A}\poonup (3,2){B}
  \psline[linecolor=red](A)(B)
  \proonup (A) \{2.83\} \{-45\} \{135\}
  \psRelLine[linecolor=blue,angle=30,trueAngle](
    A)(B)\{0.5\}\{EndNode\}
  \qdisk(EndNode){2pt}
  \psRelLine[linecolor=blue,angle=-30,trueAngle
    ](A)(B)\{0.5\}\{EndNode\}
  \qdisk(EndNode){2pt}
10 \psRelLine[linecolor=magenta,angle=90,
    trueAngle](A)(B){0.5}{EndNode}
11 \qdisk(EndNode){2pt}
12 \psRelLine[linecolor=magenta,angle=-90,
    trueAngle](A)(B){0.5}{EndNode}
  \qdisk(EndNode){2pt}
  \end{pspicture}
```

Two examples with using \multido to show the behaviour of the options trueAngle and angle.

```
\psset{yunit=4,xunit=2}
\begin{pspicture}(-1,0)(3,2)\psgrid[
  subgridcolor=lightgray]
\poonup (-1,0){A}\poonup (1,1){B}
\psline[linecolor=red](A)(3,2)
\multido{\iA=0+10}{36}{%
 \psRelLine[linecolor=blue,angle=\iA
   ](B)(A)\{-0.5\}\{EndNode\}
 \qdisk(EndNode){2pt}
\end{pspicture}
\psset{yunit=4,xunit=2}
\begin{pspicture}(-1,0)(3,2)\psgrid[
  subgridcolor=lightgray]
\poonup (-1,0){A}\poonup (1,1){B}
\psline[linecolor=red](A)(3,2)
\multido{\iA=0+10}{36}{%
 \psRelLine[linecolor=magenta,angle=\
   iA,trueAngle]{->}(B)(A){-0.5}{
   EndNode}
\end{pspicture}
```



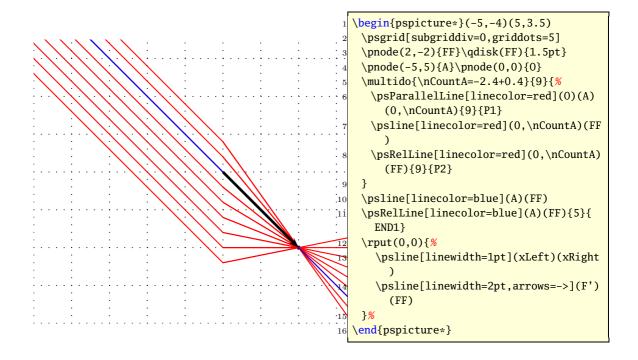
```
\psset{xunit=\linewidth,yunit=\linewidth,trueAngle}%
      \begin{pspicture}(1,0.6)%\psgrid
         \poole(.3,.35){Vk} \poole(.375,.35){D}
         \poline{20} \pol
         \poonup(0,.1){A1} \poonup(1,.31){A1}
         { \psset{linewidth=.02,linestyle=dashed,linecolor=gray}%
             \pcline(DST1)(DST2) % <- Druckseitentangente</pre>
             \pcline(A2)(A1) % <- Anstr^^f6mmrichtung
             \psIntersectionPoint(A1)(A2)(DST1)(DST2){Hk}
         \protect{Vk}(.4,.38)(Vk)(.36,.33)(.5,.32)(Hk)
         \label{line} $$ \operatorname{linecolor=red!75!green, arrows=->, arrowscale=2](Vk)(Hk)(D){.1}{FtE} $$
14
         \psRelLine[linecolor=red!75!green,arrows=->,%
                 arrowscale=2,angle=90](D)(FtE)\{4\}\{Fn\}\% why "4"?
15
         \psParallelLine[linestyle=dashed](D)(FtE)(Fn){.1}{Fnr1}
16
         \psRelLine[linestyle=dashed,angle=90](FtE)(D){-4}{Fnr2} % why "-4"?
         \psline[linewidth=1.5pt,arrows=->,arrowscale=2](D)(Fnr2)
         \psIntersectionPoint(D)([nodesep=2]D)(Fnr1)([offset=-4]Fnr1){Fh}
         \psIntersectionPoint(D)([offset=2]D)(Fnr1)([nodesep=4]Fnr1){Fv}
         \psline[linecolor=blue,arrows=->,arrowscale=2](D)(Fh)
         \psline[linecolor=blue,arrows=->,arrowscale=2](D)(Fv)
         \psline[linestyle=dotted](Fh)(Fnr1)
         \psline[linestyle=dotted](Fv)(Fnr1)
         \displaystyle \{.1\}[180](Fv)_{\scriptstyle \}
         \displaystyle \{.1\}[-45](Fnr1)\{F_{R}\}\
         \uput{.1}[90](Fn){\color{red!75!green}$F_{N}$}
         \t \{.25\}[-90](FtE){\color{red!75!green}}F_{T}$
30 \end{pspicture}
```

5 \psParallelLine

With this macro it is possible to plot lines relative to a given one, which is parallel. There is no special parameter here.

```
\psParallelLine(<P0>)(<P1>)(<P2>){<length>}{<end node name>}
\psParallelLine{<arrows>}(<P0>)(<P1>)(<P2>){<length>}{<end node name>}
\psParallelLine[<options>](<P0>)(<P1>)(<P2>){<length>}{<end node name>}
\psParallelLine[<options>]{<arrows>}(<P0>)(<P1>)(<P2>){<length>}{<end node name>}
```

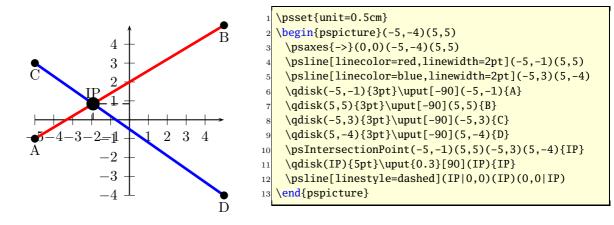
The line starts at P_2 , is parallel to $\overline{P_0P_1}$ and the length of this parallel line depends to the length factor. The end node name must be a valid nodename and shouldn't contain any of the special PostScript characters.



6 \psIntersectionPoint

This macro calculates the intersection point of two lines, given by the four coordinates. There is no special parameter here.

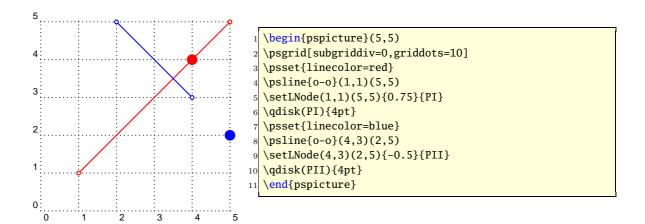
\psIntersectionPoint(<P0>)(<P1>)(<P2>)(<P3>){<node name>}



7 \psLNode and \psLCNode

\psLNode interpolates the Line \overline{AB} by the given value and sets a node at this point. The syntax is

\setLNode(P1)(P2){value}{Node name}



The \psLCNode macro builds the linear combination of the two given vectors and stores the end of the new vector as a node. All vectors start at (0,0), so a \rput maybe appropriate. The syntax is

\setLCNode(P1){value 1}(P2){value 2}{Node name}

8 \ncline, \pcline and inside errors

```
1 \begin{pspicture}(2,1)
2 \psset{arrowscale=2}
3 \Cnode(0,0){A}\Cnode(2,1){B}
4 \ncline[ArrowInside=->]{A}{B}
5 \end{pspicture}
```

```
begin{pspicture}(2,1)
psset{arrowscale=2}
cloude(0,0){A}\Cnode(2,1){B}
pcline[ArrowInside=->]{<->}(A)(B)
tend{pspicture}
```

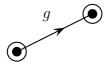
```
begin{pspicture}(2,1)

psset{arrowscale=2}

Cnode(0,0){A}\Cnode(2,1){B}

ncline[ArrowInside=-|,ArrowInsidePos=0.75]{|-|}{A}{B}

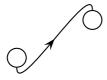
end{pspicture}
```



```
1 \psset{arrowscale=2}
2 \Cnode(0,0){A}\Cnode(2,1){B}
3 \pcline[ArrowInside=->,ArrowInsidePos=0.65]{*-*}(A)(B)
4 \naput[labelsep=0.3]{\large$g$}
```

```
\psset{arrowscale=2}
\times\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\chince\ch
```

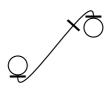
9 \nccurve, \pccurve and inside errors



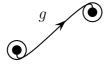
```
begin{pspicture}(2,1)
psset{arrowscale=2}
Cnode(0,0){A}\Cnode(2,1){B}
nccurve[ArrowInside=->,angleA=-90,angleB=90]{A}{B}
end{pspicture}
```



```
begin{pspicture}(2,1)
psset{arrowscale=2}
Cnode(0,0){A}\Cnode(2,1){B}
pccurve[ArrowInside=->,angleA=-90,angleB=90]{<->}(A)(B)
}end{pspicture}
```



```
1 \begin{pspicture}(2,1)
2 \psset{arrowscale=2}
3 \Cnode(0,0){A}\Cnode(2,1){B}
4 \nccurve[ArrowInside=-|,ArrowInsidePos=0.75,angleA=-90,angleB
=90]{|-|}{A}{B}
5 \end{pspicture}
```



```
1 \psset{arrowscale=2}
2 \Cnode(0,0){A}\Cnode(2,1){B}
3 \pccurve[ArrowInside=->,ArrowInsidePos=0.65,angleA=-90,angleB
=90]{*-*}(A)(B)
4 \naput[labelsep=0.3]{\large$g$}
```



```
1 \psset{arrowscale=2}
2 \Cnode(0,0){A}\Cnode(2,0){B}
3 \nccurve[ArrowInside=->,ArrowInsidePos=10,angleA=-90,angleB=90]{|-|}{A}
}{B}
4 \naput[labelsep=0.3]{\large$1$}
```

10 \resetPSTNodeOptions

Sometimes it is difficult to know what options which are changed inside a long document are different to the default one. With this macro all options depending to pst-plot can be reset. This depends to all options of the package pst-plot.

```
\def\resetPSTNodeOptions{%
  \psset{%
    nodealign=false,%
    href=0,%
    vref=.7ex,%
    framesize=10pt,%
    nodesep=0pt,%
    arm=10pt,%
    offset=0pt,%
10
    angle=0,%
    arcangle=8,%
11
    ncurv=.67,%
12
    loopsize=1cm,%
13
    boxsize=.4cm,%
14
    nrot=0,%
15
    npos=,%
16
    tpos=0.5, %
17
18
    shortput=none,%
    colsep=1.5cm, %
    rowsep=1.5cm,%
    shortput=tablr,%%
21 %
    mcol=c, %
```

11 CREDITS

11 Credits