pst-plot

plotting data and mathematical functions*

v.2.00

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Abstract

This version of pst-plot 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-plot 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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1 New options

The option tickstyle=full|top|bottom is already present in the pst-plot package, but it is mentioned here for some completness.

Table 1: All new parameters for pst-plot

Name	Type	Default
infix	none|TeX|PS	none
comma	false|true	false
xAxis	false|true	true
yAxis	false|true	true
xyAxes	false|true	true
xDecimals	<number> or empty	{}
yDecimals	<number> or empty	{}
xyDecimals	<number> or empty	{}
xLabel	<anything>	{}
yLabel	<anything>	{}
xyLabel	<anything>	{}
tickstyle	full|top|bottom	full
ticks	<all|x|y|none>	all
labels	<all|x|y|none>	all
subticks	<number>	0
xsubticks	<number>	0
ysubticks	<number>	0
ticksize	<length [length]>	-4pt 4pt
subticksize	<number>	0.75
tickwidth	<length>	0.5\pslinewidth
subtickwidth	<length>	0.25\pslinewidth
tickcolor	<color>	black
xtickcolor	<color>	black
ytickcolor	<color>	black
subtickcolor	<color>	darkgray
xsubtickcolor	<color>	darkgray
ysubtickcolor	<color>	darkgray
ticklinestyle	solid|dashed|dotted|none	solid
subticklinestyle	solid|dashed|dotted|none	solid
xlabelFactor	<anything>	{}
ylabelFactor	<anything>	{}
xlogBase	<number> or empty	{}

Name	Type	Default
ylogBase	<number> or empty	{}
xylogBase	<number> or empty	{}
logLines	<none|x|y|all>	none
nStep	<number>	1
nStart	<number>	0
nEnd	<number> or empty	{}
xStep	<number>	0
yStep	<number>	0
xStart	<number> or empty	{}
yStart	<number> or empty	{}
xEnd	<number> or empty	{}
yEnd	<number> or empty	{}
plotNo	<number>	1
plotNoMax	<number>	1
xAxisLabel	<anything>	{}
yAxisLabel	<anything>	{}
xAxisLabelPos	<(x,y)> or empty	{}
yAxisLabelPos	<(x,y)> or empty	{}
llx	<length>	0pt
lly	<length>	0pt
urx	<length>	0pt
ury	<length>	0pt
polarplot	false|true	false

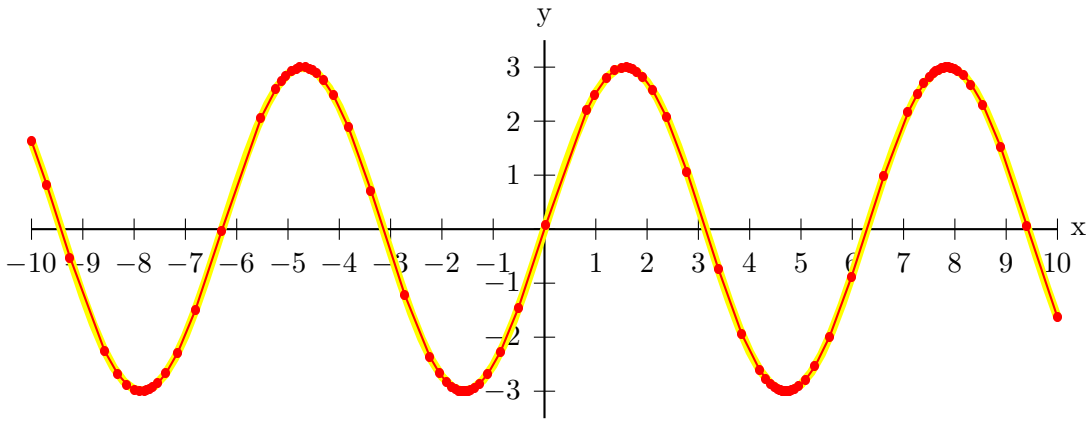
1.1 infix

By default the function of \psplot has to be described in Reversed Polish Notation, also calles postfix notation. The option infix=none|TeX|PS allows to do this in the common algebraic notation, also called infix notation. E.g.:

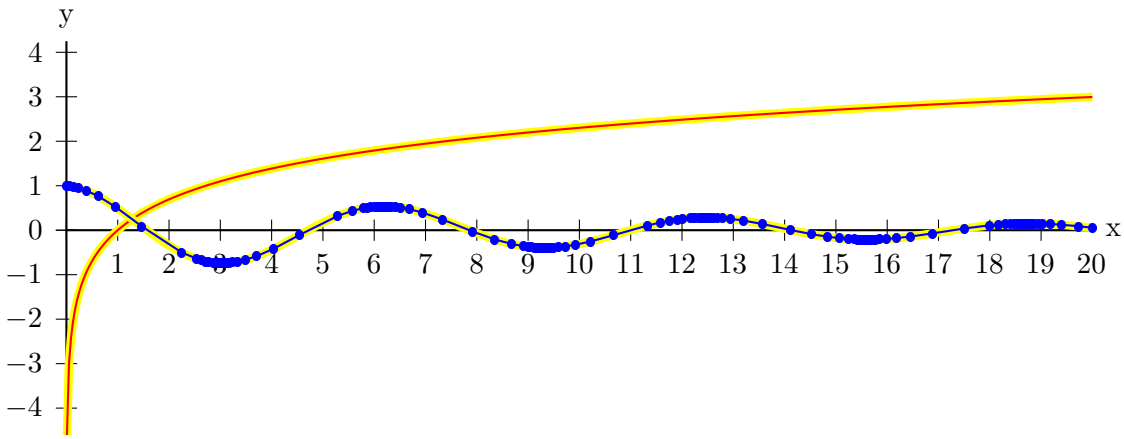
RPN	infix
x ln	ln(x)
x cos 2.71 x neg 10 div exp mul	cos(x)*2.71^(-x/10)
1 x div cos 4 mul	4*cos(1/x)

pst-plot allows two different infix-postfix conversion modes. With infix=TeX the conversion is done on TEX level (inside pst-plot) and with infix=PS it

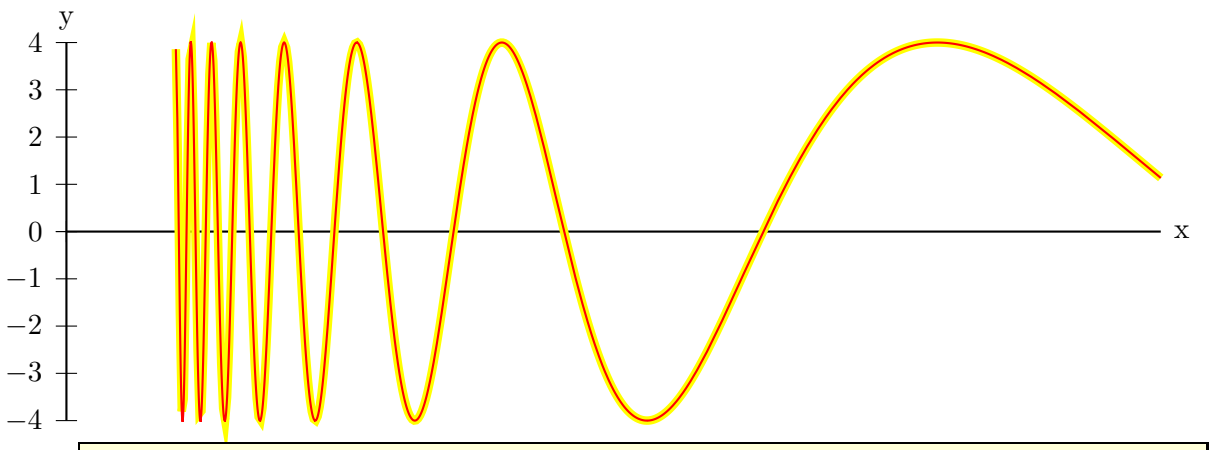
is done on PostScript level (outside of pst-plot). This is in general not important for the normal user, but allows advanced users further developing.




```
\psgraph(-10,-3.5)(10,3.5){.9\linewidth}{5cm}
  \psset{infix=PS, plotpoints=101}
  \psplot[linecolor=yellow, linewidth=4\pslinewidth]{-10}{10}{3*sin(x)}%
  \psplot[linecolor=red, showpoints=true,VarStep=0.8]{-10}{10}{3*sin(x)}
\endpsgraph
```




```
\psgraph(0,-4.25)(20,4.25){.9\linewidth}{5cm}
  \psset{infix=PS, plotpoints=501}
  \psplot[linecolor=yellow, linewidth=4\pslinewidth]{0.01}{20}{ln(x)}%
  \psplot[linecolor=red]{0.01}{20}{ln(x)}
  \psplot[linecolor=yellow, linewidth=4\pslinewidth]{0}{20}{cos(x)*2.71^(-x/10)}
  \psplot[linecolor=blue, showpoints=true,VarStep=0.8]{0}{20}{cos(x)*2.71^(-x/10)}
\endpsgraph
```



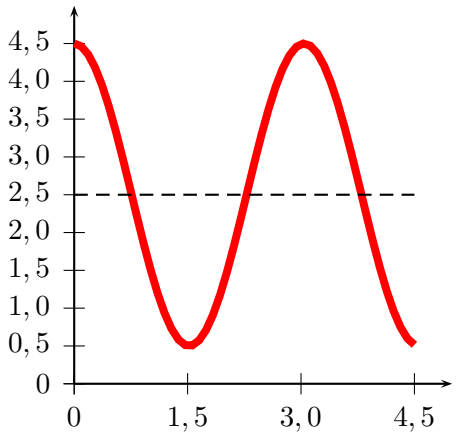

```
\begin{psgraph}(0,-4)(0.2,4){.9\linewidth}{5cm}
  \psset{infix=PS, plotpoints=501}
  \psplot[linecolor=yellow, linewidth=4\pslinewidth]{0.02}{.2}{4*cos(1/x)}%
  \psplot[linecolor=red,VarStep=0.95]{.02}{.2}{4*cos(1/x)}%
\end{psgraph}
```

1.2 comma

Syntax:

`comma=false|true`

Setting this option to true gives labels with a comma as a decimal separator instead of the dot. `comma` and `comma=true` is the same.



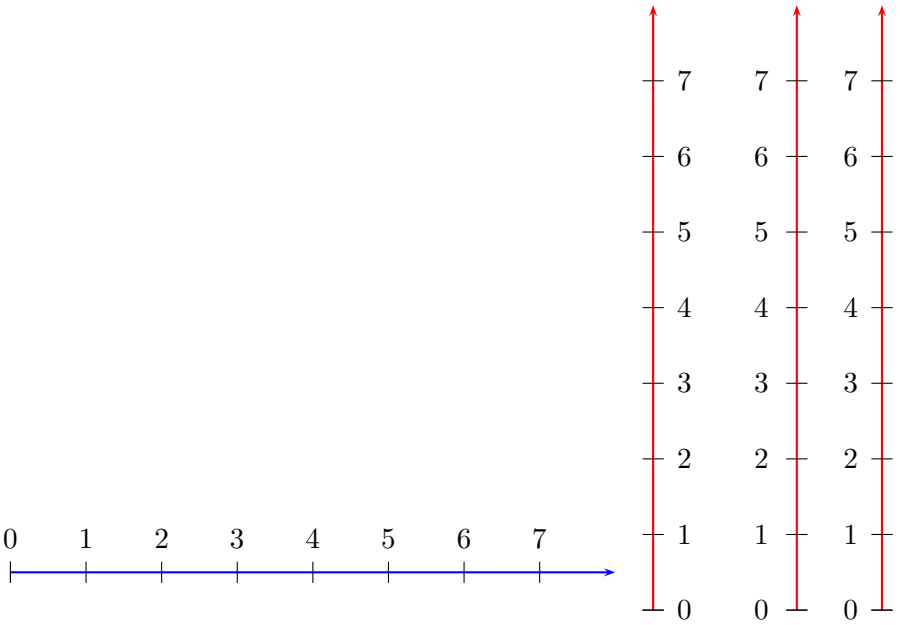

```
\begin{pspicture}(-0.5,-0.5)(5,5.5)
\psaxes[Dx=1.5,Dy=0.5,comma]{->}(5,5)
\psplot[linecolor=red,linewidth=3pt]{0}{4.5}%
   {x 180 mul 1.52 div cos 2 mul 2.5 add}
\psline[linestyle=dashed](0,2.5)(4.5,2.5)
\end{pspicture}
```

1.3 xyAxes, xAxis and yAxis

Syntax:

```
xyAxes=true|false
xAxis=true|false
yAxis=true|false
```

Sometimes there is only a need for one axis with ticks. In this case you can set one of the following options to false. The `xyAxes` makes only sense, when you want to set both, x and y to true with only one command again to the default, because with `xyAxes=false` you get nothing with the `psaxes` macro.




```
\begin{pspicture}(8,1)
\psaxes[yAxis=false,linecolor=blue]{->}(0,0.5)(8,0.5)
\end{pspicture}%
\begin{pspicture}(1,8)
\psaxes[xAxis=false,linecolor=red]{->}(0.5,0)(0.5,8)
\end{pspicture}\hspace{2em}
\begin{pspicture}(1,8)
\psaxes[xAxis=false,linecolor=red,labelsep=-20pt]{->}(0.5,0)(0.5,8)
\end{pspicture}
\begin{pspicture}(1,8)
\psaxes[xAxis=false,linecolor=red]{->}(0.5,0)(0.501,8)
\end{pspicture}%
```

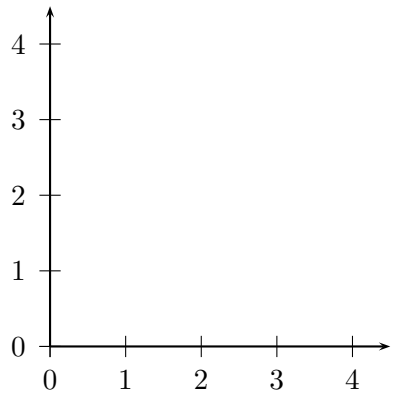
As seen in the example, a single y axis gets the labels on the right side. This can be changed in two ways, first with the option `labelsep` and second with a very short and therefore invisible x-axis (right example).

1.4 xyDecimals, xDecimals and yDecimals

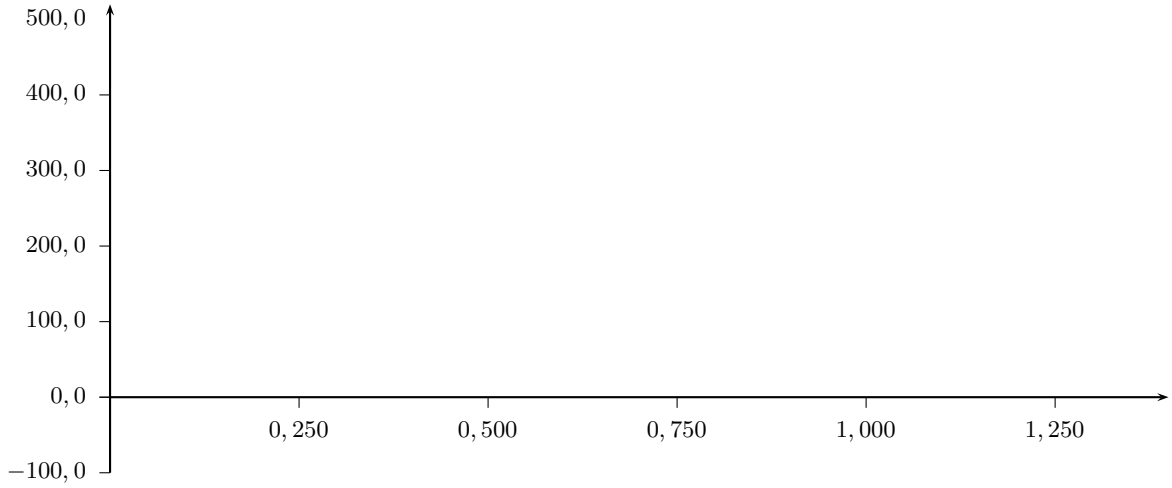
Syntax:

```
xyDecimals=<number>
xDecimals=<any>
yDecimals=<any>
```

By default the labels of the axes get numbers with or without decimals, just depending to the numbers. With these options `??Decimals` it is possible to determine the decimals, where the option `xyDecimals` sets this identical for both axes. The default setting `{}` means, that you'll get the standard behaviour.




```
\begin{pspicture}(-1.5,-0.5)(5,4.75)
  \psaxes[xyDecimals=2]{->}(0,0)(4.5,4.5)
\end{pspicture}
```



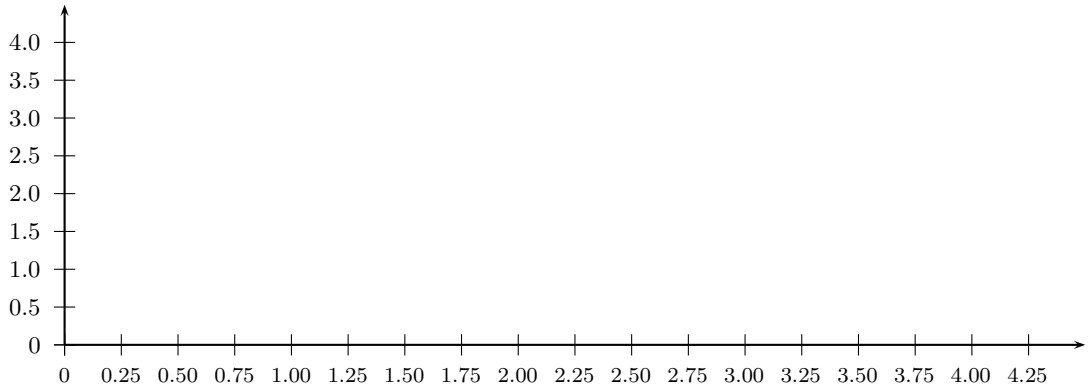

```
\psset{xunit=10cm, yunit=0.01cm}
\begin{pspicture}(-0.15,-150)(1.5,550.0)
  \psaxes[Dx=0.25,Dy=100,tickstyle=bottom,xyLabel=\footnotesize,comma=true,%
    xDecimals=3,yDecimals=1]{->}(0,0)(0,-100)(1.4,520)
\end{pspicture}
```

1.5 xyLabel, xLabel and yLabel

Syntax:

xyLabel=<any>
xLabel=<any>
yLabel=<any>

There are no special keywords to change the labelstyle for the \psaxes macro. With xyLabel it is possible to set both axes with the same command sequence. Unlike to the default pst-plot package the coordinates are not printed in mathmode. This makes it easier to choose other text styles.



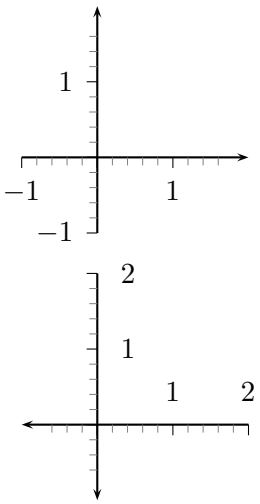

```
\psset{yunit=1cm,xunit=3cm}
\begin{pspicture}(-0.3,-0.5)(5,4.75)
\psaxes[xLabel={\scriptsize\itshape},yLabel={\sffamily\footnotesize},%
  Dy=0.5, Dx=0.25]{->}(0,0)(4.5,4.5)
\end{pspicture}
```

1.6 tickstyle

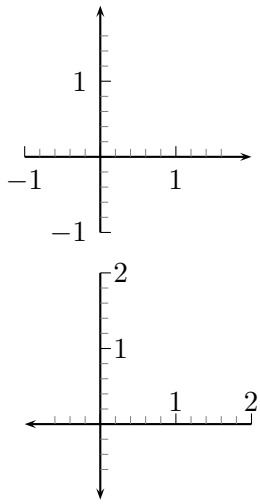
Syntax:

`tickstyle=full|bottom|top`

This option is already in the `pst-plot` package and only mentioned here for some completness.




```
\begin{pspicture}(-1,-1)(2,2)
\psaxes[tickstyle=bottom,subticks=5]{->}(0,0)(-1,-1)(2,2)
\end{pspicture}\\[0.5cm]
%
\begin{pspicture}(-1,-1)(2,2)
\psaxes[tickstyle=bottom,subticks=5]{->}(0,0)(2,2)(-1,-1)
\end{pspicture}
```




```
\begin{pspicture}(-1,-1)(2,2)
\psaxes[tickstyle=top,subticks=5]{->}(0,0)(-1,-1)(2,2)
\end{pspicture}\\[0.5cm]
%
\begin{pspicture}(-1,-1)(2,2)
\psaxes[tickstyle=top,subticks=5]{->}(0,0)(2,2)(-1,-1)
\end{pspicture}
```

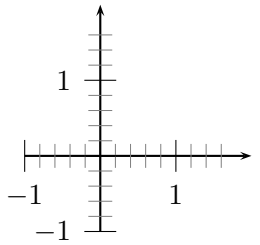
The `tickstyle` option changes the position of the labels by default. If you want the labels on the other side of an axis, then use the options `labelsep` or set the ticks with `ticksize`.

1.7 ticks

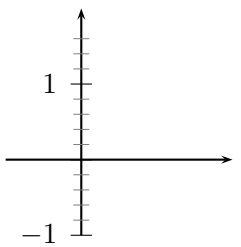
Syntax:

`ticks=all|x|y|none`

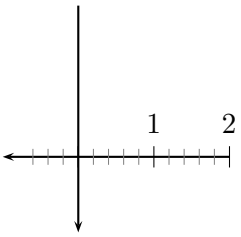
This option is also already in the `pst-plot` package and only mentioned here for some completness.



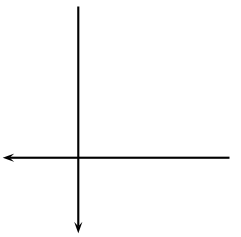

```
\psset{ticksize=6pt}
\begin{pspicture}(-1,-1)(2,2)
\psaxes[ticks=all,subticks=5]{->}(0,0)(-1,-1)(2,2)
\end{pspicture}
```




```
\begin{pspicture}(-1,-1)(2,2)
\psaxes[ticks=y,subticks=5]{->}(0,0)(-1,-1)(2,2)
\end{pspicture}
```




```
\begin{pspicture}(-1,-1)(2,2)
\psaxes[ticks=x,subticks=5]{->}(0,0)(2,2)(-1,-1)
\end{pspicture}
```



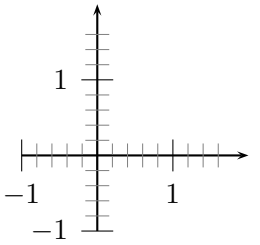
```
\begin{pspicture}(-1,-1)(2,2)
\psaxes[ticks=none,subticks=5]{->}(0,0)(2,2)(-1,-1)
\end{pspicture}
```

1.8 labels

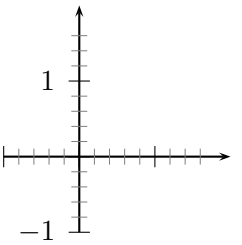
Syntax:

`labels=all|x|y|none`

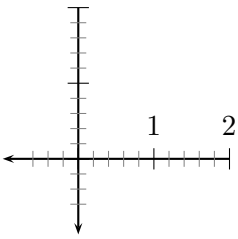
This option is also already in the `pst-plot` package and only mentioned here for some completness.



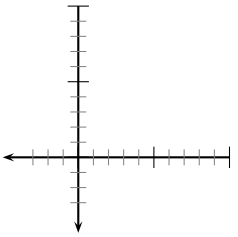

```
\psset{ticksize=6pt}
\begin{pspicture}(-1,-1)(2,2)
\psaxes[labels=all,subticks=5]{->}(0,0)(-1,-1)(2,2)
\end{pspicture}
```




```
\begin{pspicture}(-1,-1)(2,2)
\psaxes[labels=y,subticks=5]{->}(0,0)(-1,-1)(2,2)
\end{pspicture}
```




```
\begin{pspicture}(-1,-1)(2,2)
\psaxes[labels=x,subticks=5]{->}(0,0)(2,2)(-1,-1)
\end{pspicture}
```



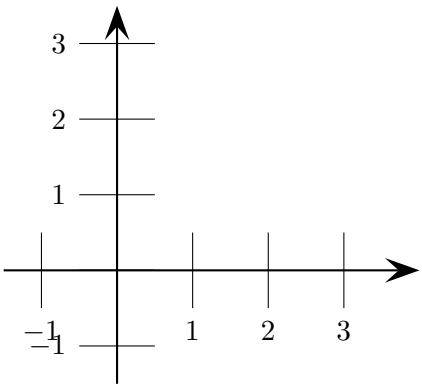
```
\begin{pspicture}(-1,-1)(2,2)
\psaxes[labels=none,subticks=5]{->}(0,0)(2,2)(-1,-1)
\end{pspicture}
```

1.9 ticksize, xticksize, yticksize

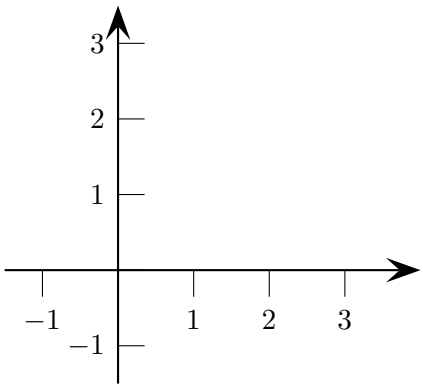
Syntax:

```
ticksize=value[unit]
ticksize=value[unit] value[unit]
xticksize=value[unit]
xticksize=value[unit] value[unit]
yticksize=value[unit]
yticksize=value[unit] value[unit]
```

`ticksize` sets both values.

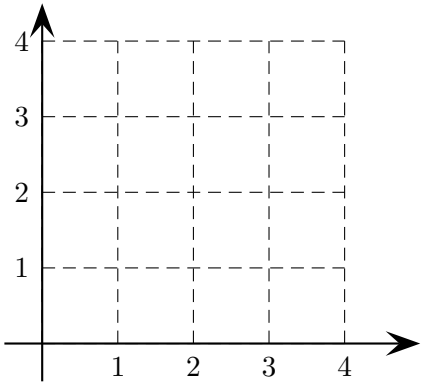



```
\psset{arrowscale=3}
\begin{pspicture}(-1.5,-1.5)(4,3.5)
  \psaxes[ticksize=0.5cm]{->}(0,0)(-1.5,-1.5)
    (4,3.5)
\end{pspicture}
```




```
\psset{arrowscale=3}
\begin{pspicture}(-1.5,-1.5)(4,3.5)
  \psaxes[xticksize=-10pt 0,yticksize=0 10pt
    ]{->}(0,0)(-1.5,-1.5)(4,3.5)
\end{pspicture}
```

A grid is also possible by setting the values to the max/min coordinates.



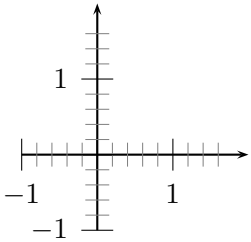

```
\psset{arrowscale=3}
\begin{pspicture}(-.5,-.5)(5,4.5)
  \psaxes[ticklinestyle=dashed,ticksize=0 4cm
    ]{->}(0,0)(-.5,-.5)(5,4.5)
\end{pspicture}
```

1.10 subticks

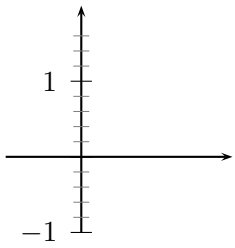
Syntax:

`subticks=<number>`

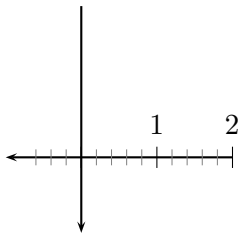
By default subticks cannot have labels.



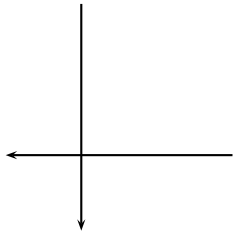

```
\psset{ticksize=6pt}
\begin{pspicture}(-1,-1)(2,2)
\psaxes[ticks=all,subticks=5]{->}(0,0)(-1,-1)(2,2)
\end{pspicture}
```




```
\begin{pspicture}(-1,-1)(2,2)
\psaxes[ticks=y,subticks=5]{->}(0,0)(-1,-1)(2,2)
\end{pspicture}
```




```
\begin{pspicture}(-1,-1)(2,2)
\psaxes[ticks=x,subticks=5]{->}(0,0)(2,2)(-1,-1)
\end{pspicture}
```



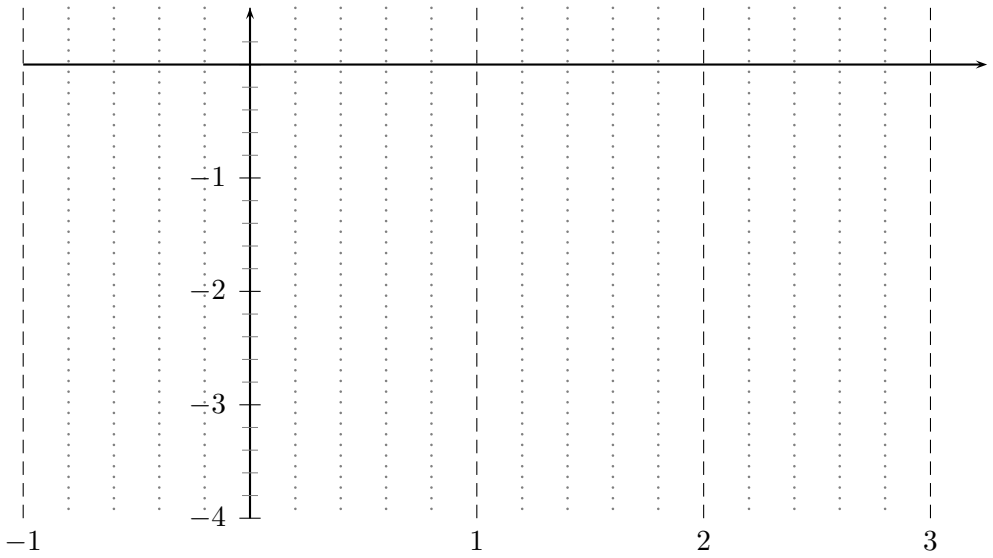
```
\begin{pspicture}(-1,-1)(2,2)
\psaxes[ticks=none,subticks=5]{->}(0,0)(2,2)(-1,-1)
\end{pspicture}
```

1.11 subticksize, xsubticksize, ysubticksize

Syntax:

```
subticksize=value
xsubticksize=value
ysubticksize=value
```

`subticksize` sets both values, which are relative to the ticksize length and can have any number. 1 sets it to the same length as the main ticks.



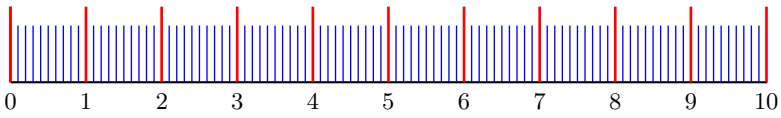

```
\psset{yunit=1.5cm,xunit=3cm}
\begin{pspicture}(-1.25,-4.5)(3.25,.75)
  \psaxes[xticksize=-4 0.5,ticklinestyle=dashed,subticks=5,xsubticksize=1,%
    ysubticksize=0.75,xsubticklinestyle=dotted,xsubtickwidth=1pt,
    subtickcolor=gray]{->}(0,0)(-1,-4)(3.25,0.5)
\end{pspicture}
```

1.12 tickcolor, subtickcolor

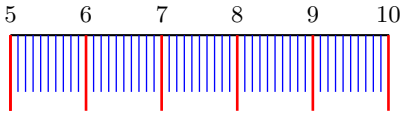
Syntax:

```
tickcolor=<color>
xtickcolor=<color>
ytickcolor=<color>
subtickcolor=<color>
xsubtickcolor=<color>
ysubtickcolor=<color>
```

`tickcolor` and `subtickcolor` set both for the x- and the y-Axis.




```
\begin{pspicture}(0,-0.75)(10,1)
\psaxes[xLabel=\footnotesize,labelsep=2pt,yAxis=false,%
  labelsep=-10pt,ticksize=0 10mm,subticks=10,subticksize=0.75,%
  tickcolor=red,subtickcolor=blue,tickwidth=1pt,%
  subtickwidth=0.5pt](10.01,0)
\end{pspicture}
```



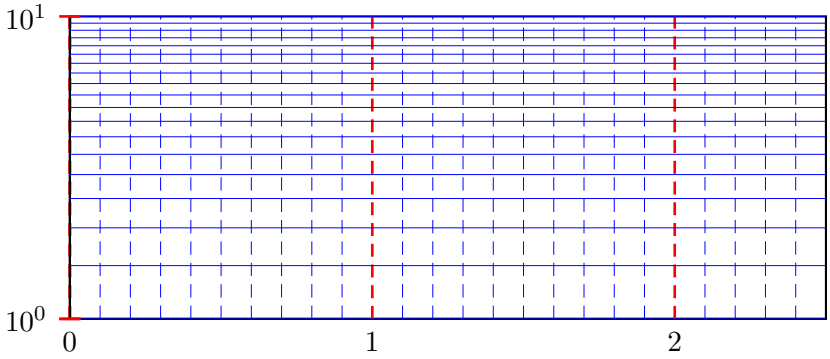

```
\begin{pspicture}(5,-0.75)(10,1)
\psaxes[xLabel=\footnotesize,labelsep=2pt,yAxis=false,%
  labelsep=5pt,ticksize=0 -10mm,subticks=10,subticksize
    =0.75,%
  tickcolor=red,subtickcolor=blue,tickwidth=1pt,%
  subtickwidth=0.5pt,0x=5](5,0)(5,0)(10.01,0)
\end{pspicture}
```

1.13 ticklinestyle and subticklinestyle

Syntax:

```
ticklinestyle=solid|dashed|dotted|none
xticklinestyle=solid|dashed|dotted|none
yticklinestyle=solid|dashed|dotted|none
subticklinestyle=solid|dashed|dotted|none
xsubticklinestyle=solid|dashed|dotted|none
ysubticklinestyle=solid|dashed|dotted|none
```

`ticklinestyle` and `subticklinestyle` set both values for the x and y axis.
The value `none` doesn't really makes sense, because it is the same to `[sub]ticklines=0`

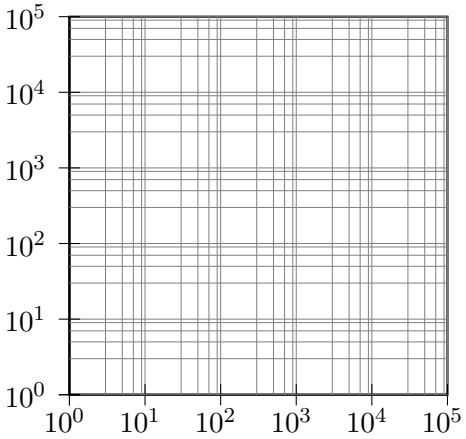



```
\psset{unit=4cm}
\pspicture(-0.15,-0.15)(2.5,1)
 \psaxes[axesstyle=frame,logLines=y,xticksize=0 1,xsubticksize=1,%
   ylogBase=10,tickcolor=red,subtickcolor=blue,tickwidth=1pt,%
   subticks=20,xsubticks=10,xticklinestyle=dashed,%
   xsubticklinestyle=dashed](2.5,1)
\endpspicture
```

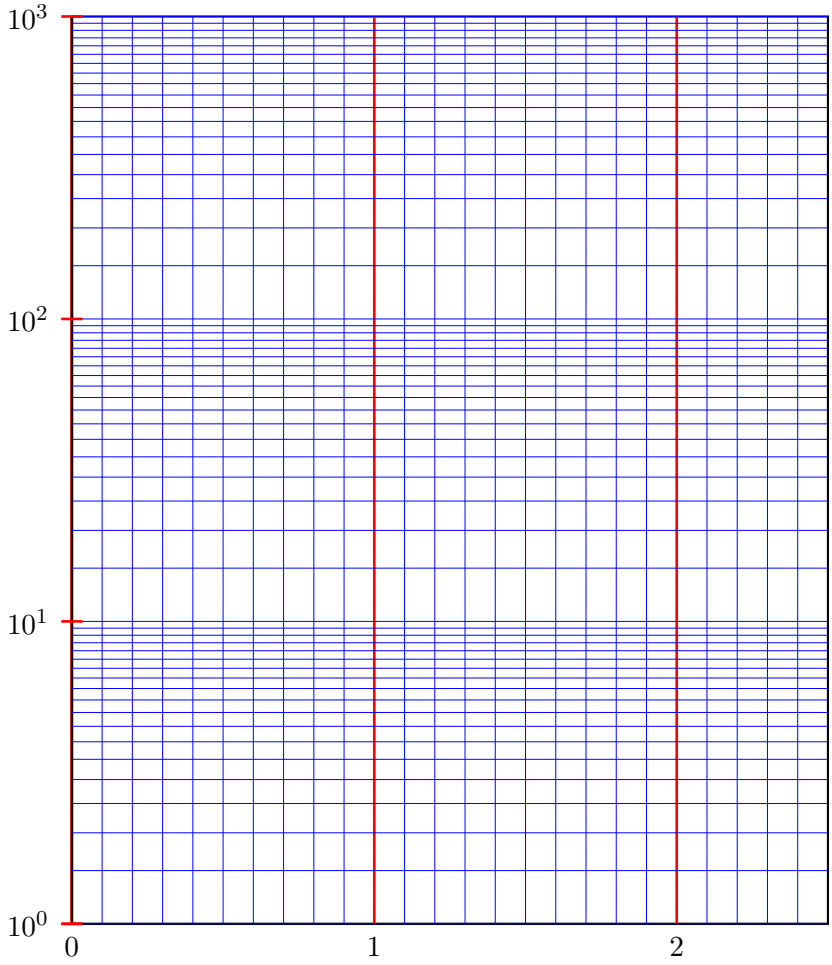
1.14 loglines

Syntax:

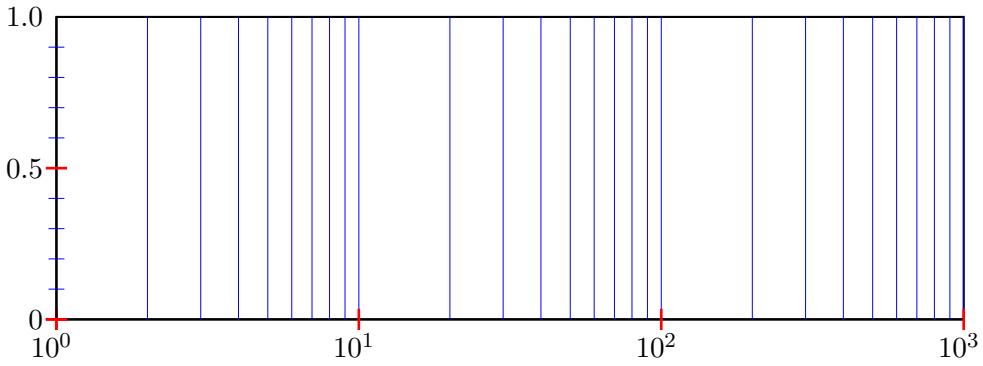
`loglines=all|x|y`




```
\pspicture(0,-1)(5,5)
  \psaxes[subticks=5,axesstyle=frame,xylogBase=10,
    logLines=all](5,5)
\endpspicture
```




```
\psset{unit=4cm}
\pspicture(-0.15,-0.15)(2.5,3)
 \psaxes[axesstyle=frame,logLines=y,xticksize=0 3,xsubticksize=1,%
   ylogBase=10,tickcolor=red,subtickcolor=blue,tickwidth=1pt,%
   subticks=20,xsubticks=10](2.5,3)
\endpspicture
```



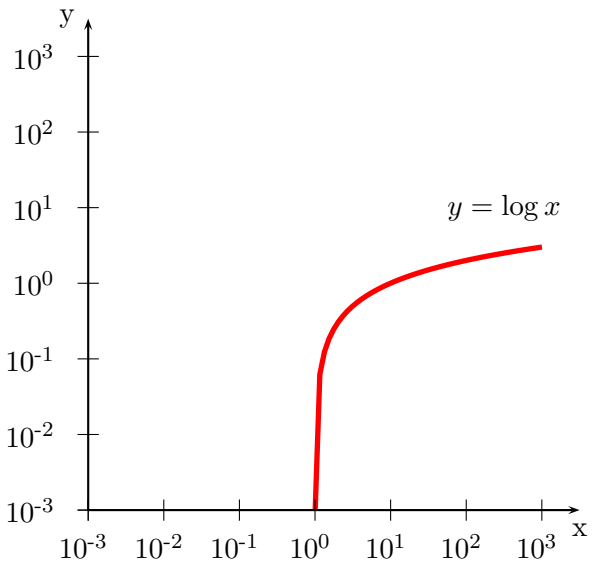

```
\psset{unit=4}
\pspicture(0,-0.3)(3,1.2)
  \psaxes[axesstyle=frame,logLines=x,xlogBase=10,Dy=0.5,%
    tickcolor=red,subtickcolor=blue,tickwidth=1pt,ysubticks=5,xsubticks=10](3,1)
\endpspicture
```

1.15 xylogBase, xlogBase and ylogBase

There are additional options `xylogBase` xlogBase | ylogBase| to get one or both axes with logarithm labels. For an intervall of $[10^{-3}...10^{2}]$ choose a `pstricks` intervall of [-3,2]. `pstricks` takes 0 as the origin of this axes, which is wrong if we want to have a logarithm axes. With the options `0y` and `0x` we can set the origin to -3, so that the first label gets 10^{-3}. If this is not done by the user then `pstricks-add` does it by default. An alternative is to set these parameters to empty values `0x={},0y={}`, in this case `pstricks-add` does nothing.

1.15.1 xylogBase

This mode is in math also called double logarithm. It is a combination of the two forgoing modes and the function is now $y = \log x$ and is shown in the following example.




```
\begin{pspicture}(-3.5,-3.5)(3.5,3.5)
  \psplot[linewidth=2pt,linecolor=red
    ]{0.001}{3}{x log}
  \psaxes[xylogBase=10,0y=-3]{->}(-3,-3)
    (3.5,3.5)
  \uput[-90](3.5,-3){x}
  \uput[180](-3,3.5){y}
  \rput(2.5,1){$y=\log x$}
\end{pspicture}
```

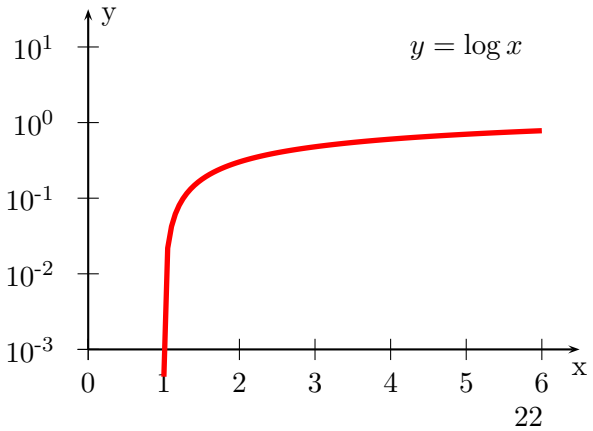
1.15.2 ylogBase

The values for the psaxes y-coordinate are now the exponents to the base 10 and for the right function to the base e: $10^{-3} \ldots 10^{1}$ which corresponds to the given y-intervall $-3 \ldots 1.5$, where only integers as exponents are possible. These logarithm labels have no effect to the internal used units. To draw the logarithm function we have to use the math function

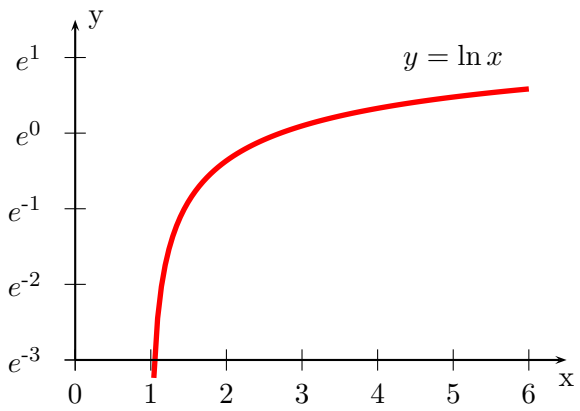
$$y = \log\{\log x\}$$

$$y = \ln\{\ln x\}$$

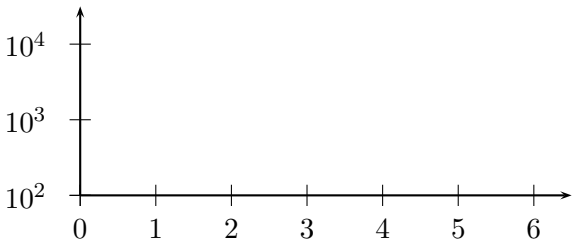
with an drawing intervall of $1.001 \ldots 6$.



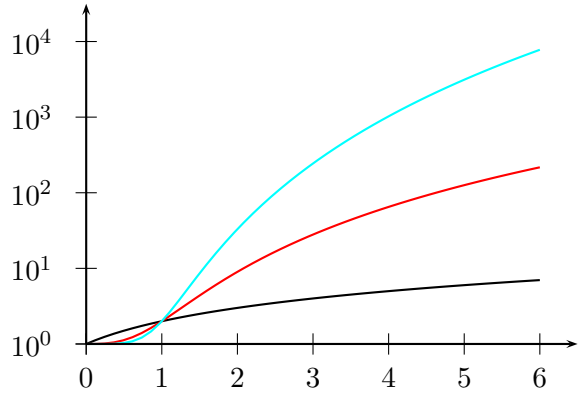

```
\begin{pspicture}(-0.5,-3.5)(6.5,1.5)
  \psaxes[ylogBase=10]{->}(0,-3)(6.5,1.5)
  \uput[-90](6.5,-3){x}
  \uput[0](0,1.4){y}
  \rput(5,1){$y=\log x$}
  \psplot[linewidth=2pt,%
  plotpoints=100,linecolor=red]{1.001}{6}{x
    log log} % log(x)
\end{pspicture}
```



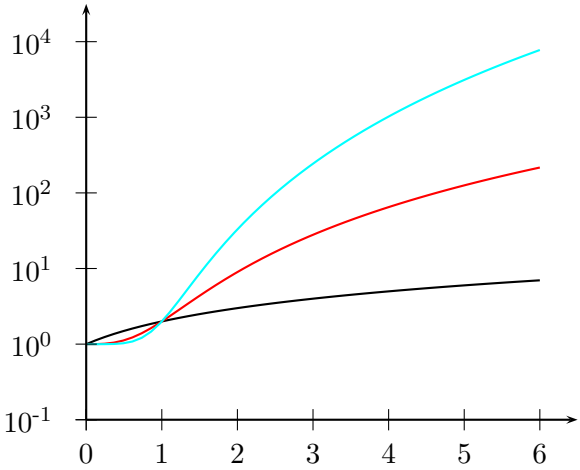

```
\begin{pspicture}(-0.5,-3.5)(6.5,1.5)
  \psplot[linewidth=2pt,plotpoints=100,linecolor=red]%
    {1.04}{6}{/ln {log 0.4343 div} def x ln ln} % log(x)
  \psaxes[ylogBase=e]{->}(0,-3)(6.5,1.5)
  \uput[-90](6.5,-3){x}
  \uput[0](0,1.5){y}
  \rput(5,1){$y=\ln x$}
\end{pspicture}
```



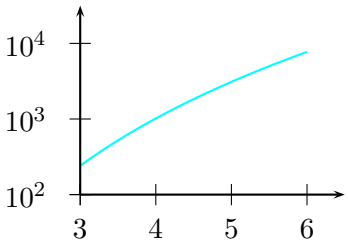

```
  \begin{pspicture}(-0.5,1.5)(6.5,4.5)
    \psaxes[ylogBase=10,0y=2]{->}(0,2)(0,2)(6.5,4.5)
  \end{pspicture}
```




```
\begin{pspicture}(-0.5,-0.5)(6.5,4.5)
  \psplot{0}{6}{x x cos add log}          % x  + cox(x)
  \psplot[linecolor=red]{0}{6}{x 3 exp x cos add log} % x^3 + cos(x)
  \psplot[linecolor=cyan]{0}{6}{x 5 exp x cos add log} % x^5 + cos(x)
  \psaxes[ylogBase=10]{->}(6.5,4.5)
\end{pspicture}
```



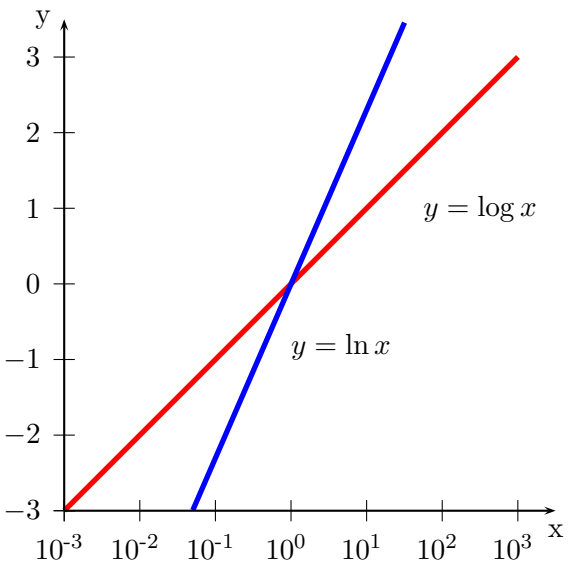

```
\begin{pspicture}(-0.5,-1.5)(6.5,4.5)
  \psplot{0}{6}{x x cos add log}          % x  + cox(x)
  \psplot[linecolor=red]{0}{6}{x 3 exp x cos add log} % x^3 + cos(x)
  \psplot[linecolor=cyan]{0}{6}{x 5 exp x cos add log} % x^5 + cos(x)
  \psaxes[ylogBase=10]{->}(0,-1)(0,-1)(6.5,4.5)
\end{pspicture}
```



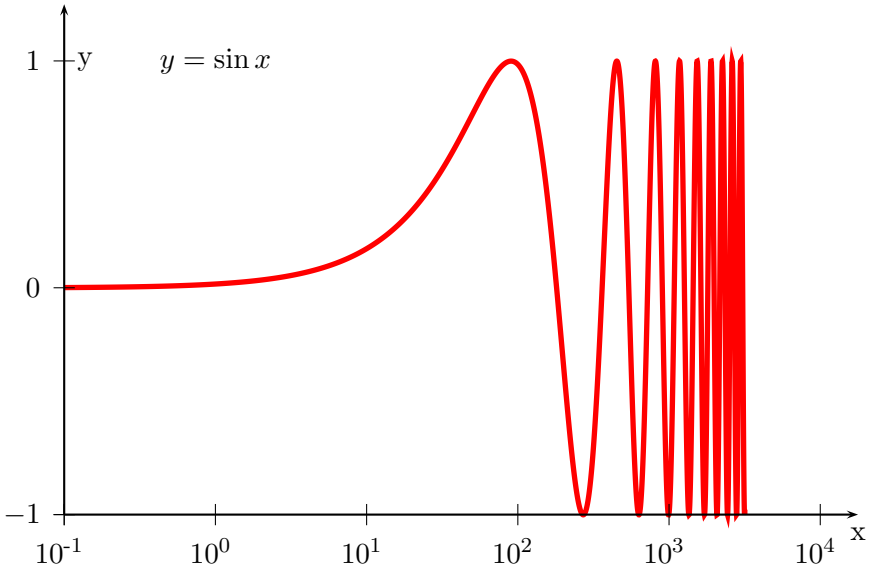

```
\begin{pspicture}(2.5,1.75)(6.5,4.5)
  \psplot[linecolor=cyan]{3}{6}{x 5 exp x cos add log} % x^5 +
    cos(x)
  \psaxes[ylogBase=10,0x=3,0y=2]{->}(3,2)(3,2)(6.5,4.5)
\end{pspicture}
```

1.15.3 xlogBase

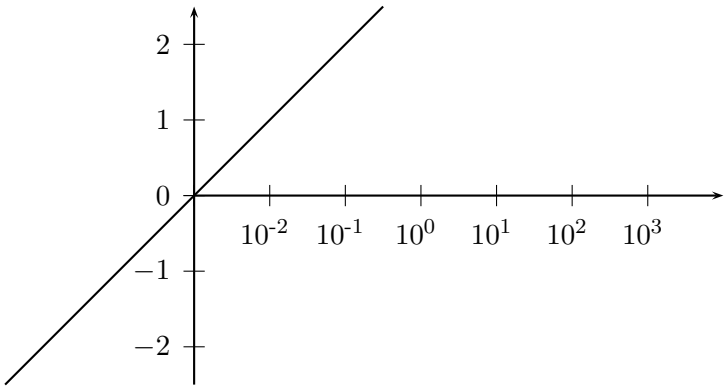
Now we have to use the easy math function $y = x$ because the x axis is still $\log x$.



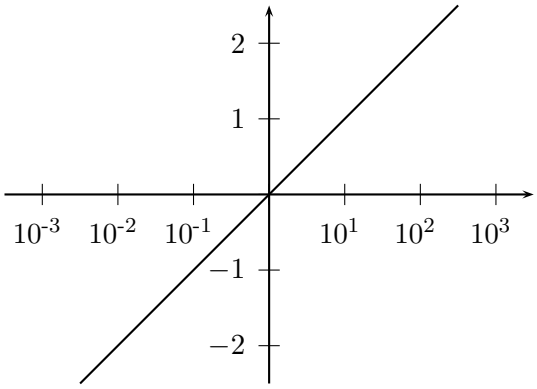

```
\begin{pspicture}(-3.5,-3.5)(3.5,3.5)
  \psplot[linewidth=2pt,linecolor=red
    ]{-3}{3}{x} % log(x)
  \psplot[linewidth=2pt,linecolor=blue
    ]{-1.3}{1.5}{x 0.4343 div} % ln(x)
  \psaxes[xlogBase=10,0y=-3]{->}(-3,-3)
    (3.5,3.5)
  \uput[-90](3.5,-3){x}
  \uput[180](-3,3.5){y}
  \rput(2.5,1){$y=\log x$}
  \rput[lb](0,-1){$y=\ln x$}
\end{pspicture}
```




```
\psset{yunit=3cm,xunit=2cm}
\begin{pspicture}(-1.25,-1.25)(4.25,1.5)
  \uput[-90](4.25,-1){x}
  \uput[0](-1,1){y}
  \rput(0,1){$y=\sin x$}
  \psplot[linewidth=2pt,plotpoints=5000,linecolor=red]{-1}{3.5}{10 x exp sin }
  \psaxes[xlogBase=10,0y=-1]{->}(-1,-1)(4.25,1.25)
\end{pspicture}
```



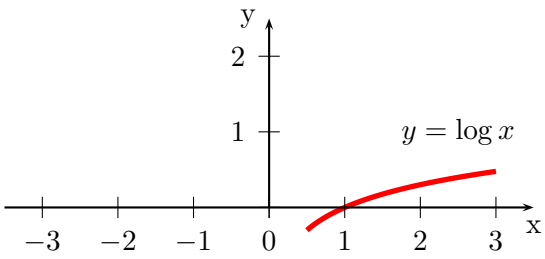

```
\begin{pspicture}(-3.5,-2.75)(3.5,2.5)
  \psaxes[xlogBase=10]{->}(0,0)(-3.5,-2.5)(3.5,2.5)
  \psplot{-2.5}{2.5}{10 x exp log}
\end{pspicture}
```




```
\begin{pspicture}(-3.5,-2.75)(3.5,2.5)
  \psaxes[xlogBase=10,0x={},0y={}]{->}(0,0)
    (-3.5,-2.5)(3.5,2.5)
  \psplot{-2.5}{2.5}{10 x exp log}
\end{pspicture}
```

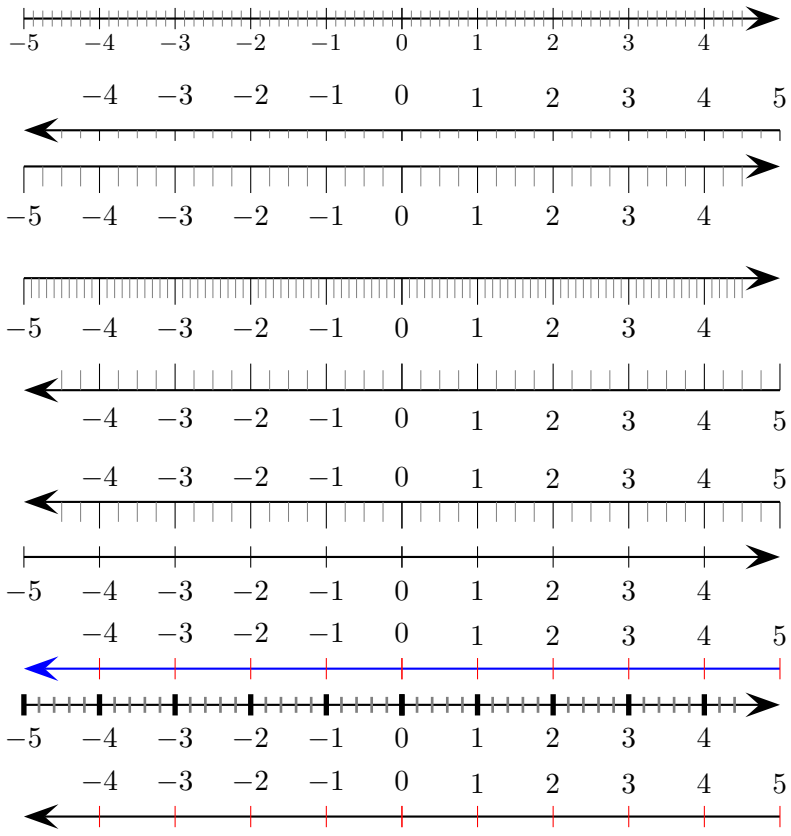
1.15.4 No logstyle (xylogBase={})

This is only a demonstration that the default option `logBase={}` still works ... :-)



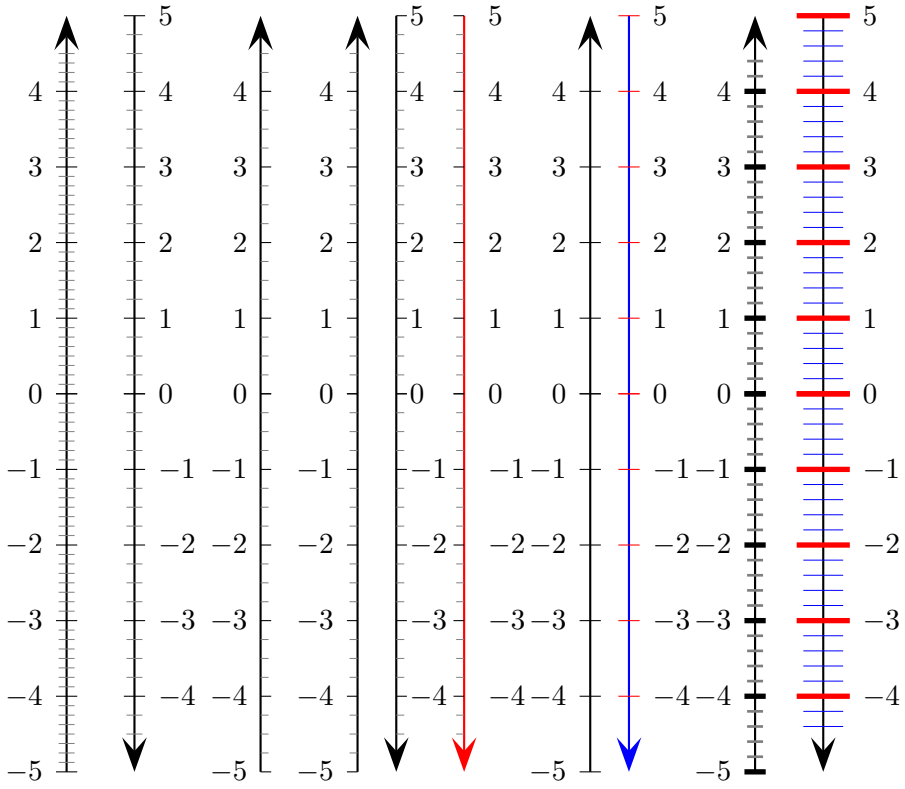

```
\begin{pspicture}(-3.5,-0.5)(3.5,2.5)
  \psplot[linewidth=2pt,linecolor=red,
    xylogBase={}]{0.5}{3}{x log} % log(x)
  \psaxes{->}(0,0)(-3.5,0)(3.5,2.5)
  \uput[-90](3.5,0){x}
  \uput[180](0,2.5){y}
  \rput(2.5,1){$y=\log x$}
\end{pspicture}
```

1.16 subticks, tickwidth and subtickwidth



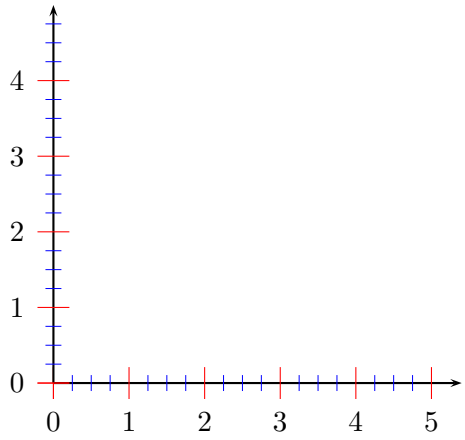

```
\psset{arrowscale=3}
 \psaxes[xLabel=\footnotesize,labelsep=2pt,yAxis=false,subticks
   =8]{->}(0,0)(-5,-1)(5,1)\\[1cm]
 \psaxes[yAxis=false,subticks=4,tickstyle=bottom]{->}(0,0)(5,1)(-5,-1)\\
 \psaxes[yAxis=false,subticks=4,ticksize=-10pt 0]{->}(0,0)(-5,-5)(5,5)
   \\[1cm]
```

```
\psaxes[yAxis=false,subticks=10,ticksize=0 -10pt,labelsep=15pt
  ]{->}(0,0)(-5,-5)(5,5)\\[1cm]
\psaxes[yAxis=false,subticks=4,ticksize=0 10pt,labelsep=-15pt]{->}(0,0)
  (5,5)(-5,-5)\\[1cm]
\psaxes[yAxis=false,subticks=4,ticksize=0 -10pt]{->}(0,0)(5,5)(-5,-5)
  \\[0.25cm]
\psaxes[yAxis=false,subticks=0]{->}(0,0)(-5,-5)(5,5)\\[1cm]
\psaxes[yAxis=false,subticks=0,tickcolor=red,linecolor=blue]{->}(0,0)
  (5,5)(-5,-5)\\
\psaxes[yAxis=false,subticks=5,tickwidth=2pt,subtickwidth=1pt]{->}(0,0)
  (-5,-5)(5,5)\\[1cm]
\psaxes[yAxis=false,subticks=0,tickcolor=red]{->}(0,0)(5,5)(-5,-5)
```

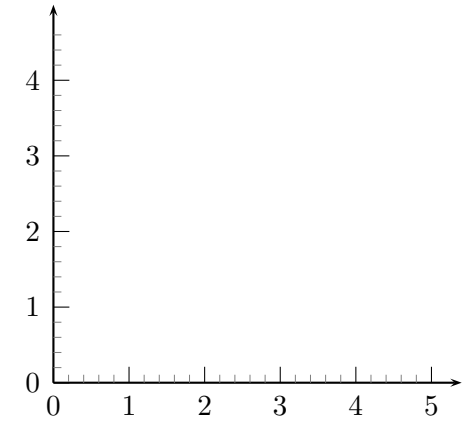


```
\psset{arrowscale=3}
\psaxes[xAxis=false,subticks=8]{->}(0,0)(-5,-5)(5,5)\hspace{2em}
\psaxes[xAxis=false,subticks=4]{->}(0,0)(5,5)(-5,-5)\hspace{4em}
\psaxes[xAxis=false,subticks=4,tickstyle=top]{->}(0,0)(-5,-5)(5,5)\
  hspace{3em}
\psaxes[xAxis=false,subticks=4,tickstyle=bottom]{->}(0,0)(-5,-5)(5,5)\
  hspace{1em}
```

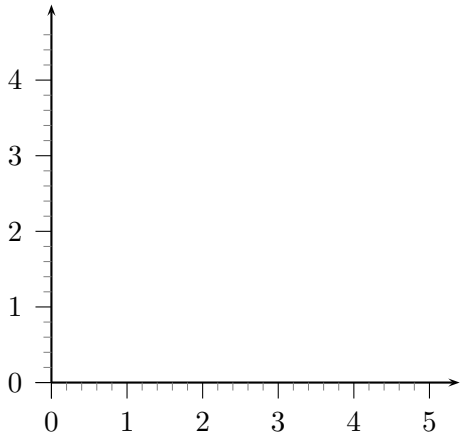
```
\psaxes[xAxis=false,subticks=4,tickstyle=top]{->}(0,0)(5,5)(-5,-5)\
  hspace{2em}
\psaxes[xAxis=false,subticks=4,tickstyle=bottom,linecolor=red]{->}(0,0)
  (5,5)(-5,-5)\hspace{4em}
\psaxes[xAxis=false,subticks=0]{->}(0,0)(-5,-5)(5,5)\hspace{1em}
\psaxes[xAxis=false,subticks=0,tickcolor=red,linecolor=blue]{->}(0,0)
  (5,5)(-5,-5)\hspace{4em}
\psaxes[xAxis=false,subticks=5,tickwidth=2pt,subtickwidth=1pt]{->}(0,0)
  (-5,-5)(5,5)\hspace{2em}
\psaxes[xAxis=false,subticks=5,tickcolor=red,tickwidth=2pt,%
   ticksize=10pt,subtickcolor=blue,subticksize=0.75]{->}(0,0)(5,5)
     (-5,-5)
```



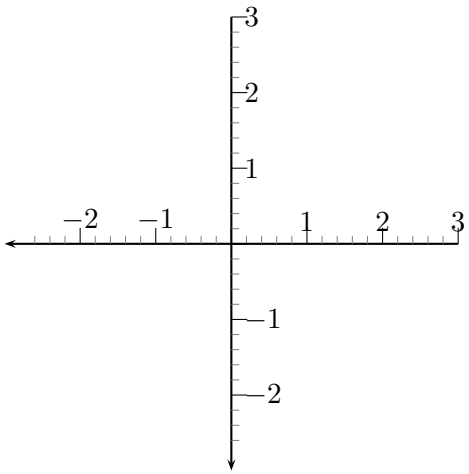

```
\pspicture(5,5.5)
\psaxes[subticks=4,ticksize=6pt,subticksize=0.5,%
  tickcolor=red,subtickcolor=blue]{->}(5.4,5)
\endpspicture
```



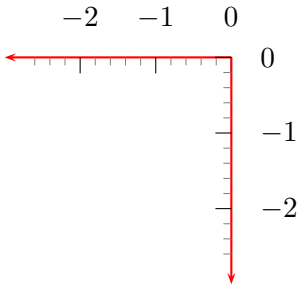

```
\pspicture(5,5.5)
  \psaxes[subticks=5,ticksize=6pt,subticksize=0.5,
    tickstyle=top]{->}(5.4,5)
\endpspicture
```



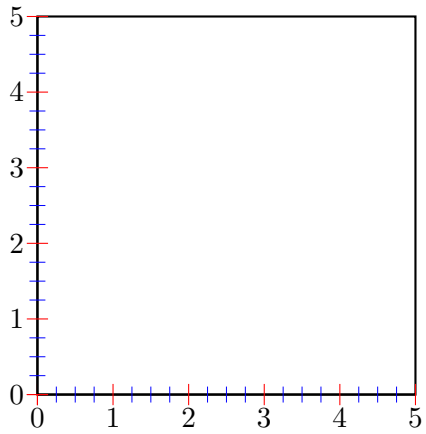

```
\pspicture(5,5.5)
  \psaxes[subticks=5,ticksize=6pt,subticksize=0.5,
    tickstyle=bottom]{->}(5.4,5)
\endpspicture
```



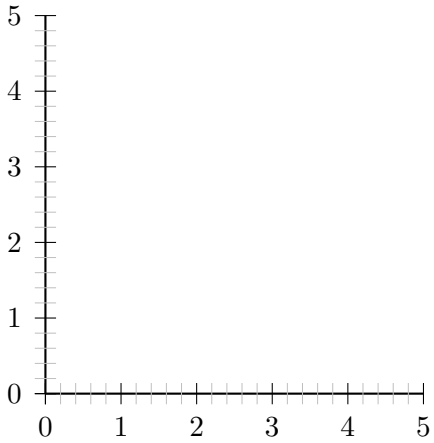

```
\pspicture(-3,-3)(3,3.5)
  \psaxes[subticks=5,ticksize=6pt,subticksize
    =0.5,tickstyle=top]{->}(0,0)(3,3)(-3,-3)
\endpspicture
```



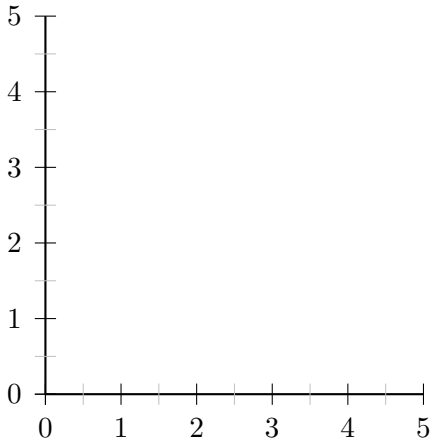

```
\pspicture(0,0.5)(-3,-3)
  \psaxes[subticks=5,ticksize=6pt,subticksize
    =0.5,%
    tickstyle=bottom,linecolor=red]{->}(-3,-3)
\endpspicture
```



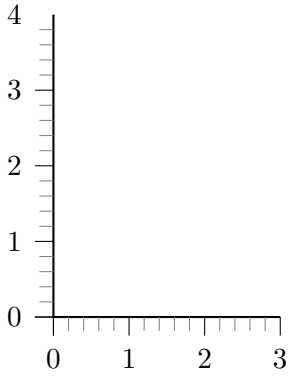

```
\psset{axesstyle=frame}
\pspicture(5,5.5)
  \psaxes[subticks=4,tickcolor=red,subtickcolor=blue
    ](5,5)
\endpspicture
```



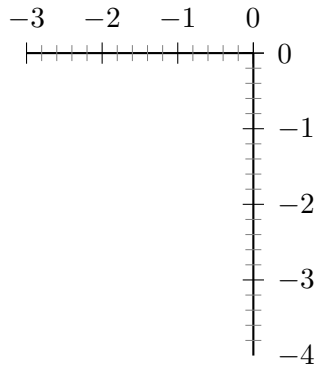

```
\pspicture(5,5.5)
  \psaxes[subticks=5,subticksize=1,subtickcolor=
    lightgray](5,5)
\endpspicture
```



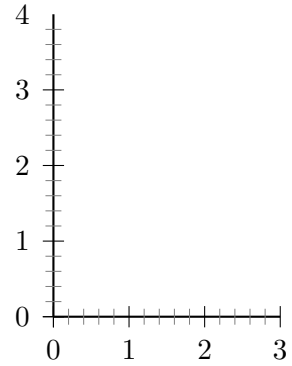

```
\pspicture(5,5.5)
  \psaxes[subticks=2,subticksize=1,subtickcolor=
    lightgray](5,5)
\endpspicture
```



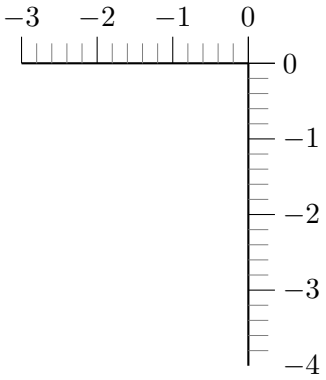

```
\pspicture(3,4.5)
  \psaxes[subticks=5,ticksize=-7pt 0](3,4)
\endpspicture
```




```
\pspicture(0,1)(-3,-4)
  \psaxes[subticks=5](-3,-4)
\endpspicture
```



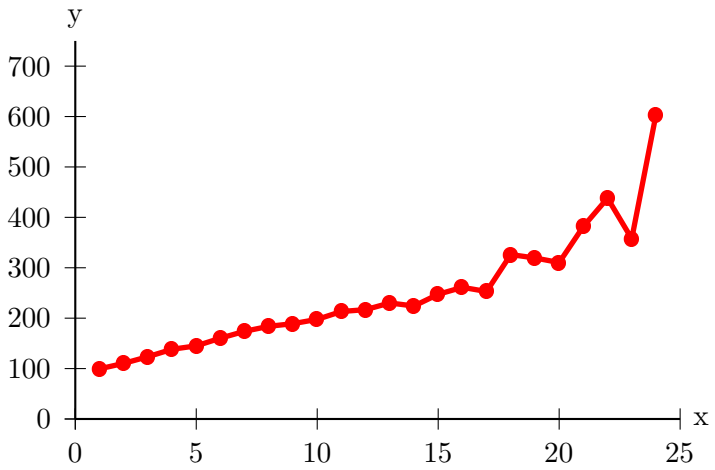

```
\pspicture(3,4.5)
  \psaxes[axesstyle=axes,subticks=5](3,4)
\endpspicture
```




```
\pspicture(0,1)(-3,-4)
  \psaxes[axesstyle=axes,subticks=5,%
    ticksize=0 10pt,labelsep=13pt](-3,-4)
\endpspicture
```

1.17 xlabelFactor and ylabelFactor

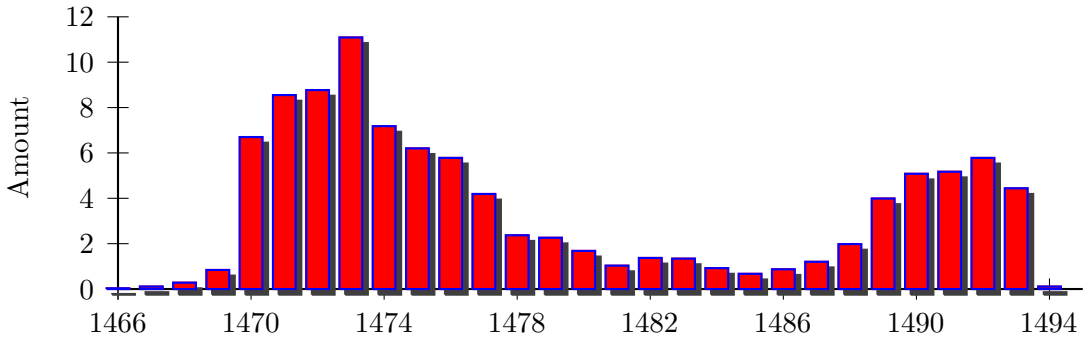
When having big numbers as data records then it makes sense to write the values as $< number > \cdot 10^{<exp>}$. These new options allow to define the additional part of the value.



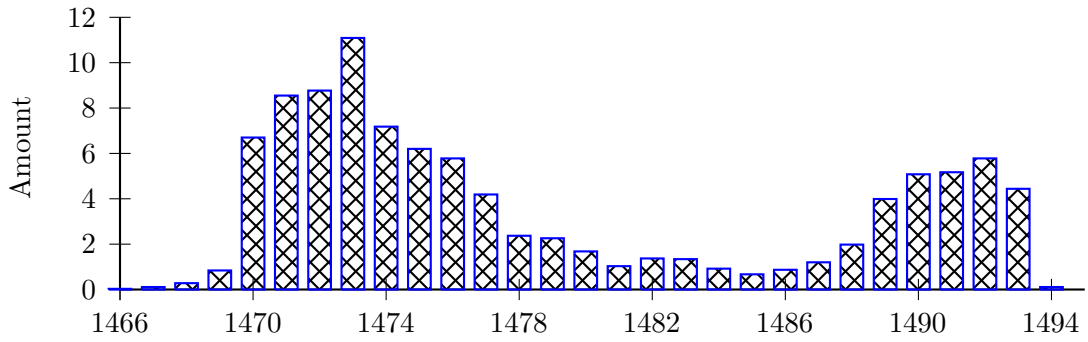

```
\readdata{\data}{demo1.dat}
\pstScalePoints(1,0.000001){}{}% (x,y){additional x operator}{y op}
\psset{llx=-1cm,lly=-1cm}
\psgraph[ylabelFactor={\cdot 10^6},Dx=5,Dy=100](0,0)(25,750){8cm}{5cm}
  \listplot[linecolor=red, linewidth=2pt, showpoints=true]{\data}
\endpsgraph
\pstScalePoints(1,1){}{}% reset
```

1.18 Plot style **bar** and option **barwidth**

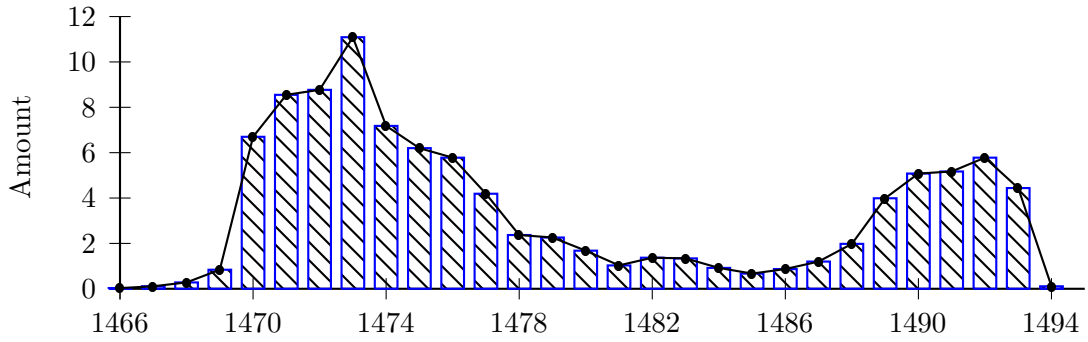
This option allows to draw bars for the data records. The width of the bars is controlled by the option `barwidth`, which is set by default to value of `0.25cm`, which is the total width.




```
\psset{xunit=.44cm,yunit=.3cm}
\begin{pspicture}(-2,-1.75)(29,13)
  \psaxes[axesstyle=axes,Ox=1466,Oy=0,Dx=4,Dy=2,%
    ylabelFactor={\,\%}]{-}(29,12)
  \listplot[shadow=true,linecolor=blue,plotstyle=bar,barwidth=0.3cm,
    fillcolor=red,fillstyle=solid]{\barData}
  \rput{90}(-3,6.25){Amount}
\end{pspicture}
```




```
\psset{xunit=.44cm,yunit=.3cm}
\begin{pspicture}(-2,-1.75)(29,13)
  \psaxes[axesstyle=axes,Ox=1466,Oy=0,Dx=4,Dy=2,%
    ylabelFactor={\,\%}]{-}(29,12)
  \listplot[linecolor=blue,plotstyle=bar,barwidth=0.3cm,
    fillcolor=red,fillstyle=crosshatch]{\barData}
  \rput{90}(-3,6.25){Amount}
\end{pspicture}
```




```
\psset{xunit=.44cm,yunit=.3cm}
\begin{pspicture}(-2,-1.75)(29,13)
  \psaxes[axesstyle=axes,Ox=1466,Oy=0,Dx=4,Dy=2,%
    ylabelFactor={\,\%}]{-}(29,12)
  \listplot[linecolor=blue,plotstyle=bar,barwidth=0.3cm,
    fillcolor=red,fillstyle=vlines]{\barData}
  \listplot[showpoints=true]{\barData}
  \rput{90}(-3,6.25){Amount}
\end{pspicture}
```

1.19 New options for \readdata

By default the macros \readdata reads every data record, which could be annoying when there are more than 10000 records to read. The package pst-plot-add defines an additional key nStep, which allows to read only a selected part of the data records, e.g. nStep=10, only every 10^{th} records is saved.

```
1 \readdata[nStep=10]{\dataA}{stressrawdata.dat}
```

The default value for nStep is 1.

2 New options for \listplot

By default the plot macros \dataplot, \fileplot and \listplot plot every data record. The package pst-plot-add defines additional keys nStep, nStart, nEnd and xStep, xStart, xEnd, which allows to plot only a selected part of the data records, e.g. nStep=10. These "n" options mark the number of the record to be plot $(0, 1, 2, ...)$ and the "x" ones the x-values of the data records.

Name	Default setting
nStart	1
nEnd	{}
nStep	1
xStart	{}
xEnd	{}
yStart	{}
yEnd	{}
xStep	0
plotNo	1
plotNoMax	1

These new options are only available for the \listplot macro, which is not a real limitation, because all data records can be read from a file with the \readdata macro (see example files or [3]):

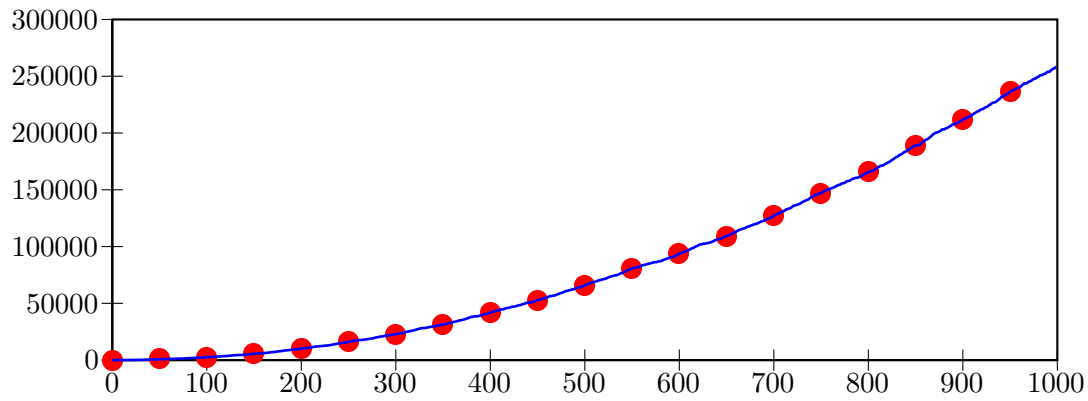
```
\readdata[nStep=10]{\data}{/home/voss/data/data1.dat}
```

The use `nStep` and `xStep` options make only real sense when also using the option `plotstyle=dots`. Otherwise the coordinates are connected by a line as usual. Also the `xStep` option needs increasing x values. Pay attention that `nStep` can be used for `\readdata` and for `\listplot`. If used in both macros than the effect is multiplied, e.g. `\readdata` with `nStep=5` and `\listplot` with `nStep=10` means, that only every 50^{th} data records is read and plotted.

When both, `x/yStart/End` are defined then the values are also compared with both values.

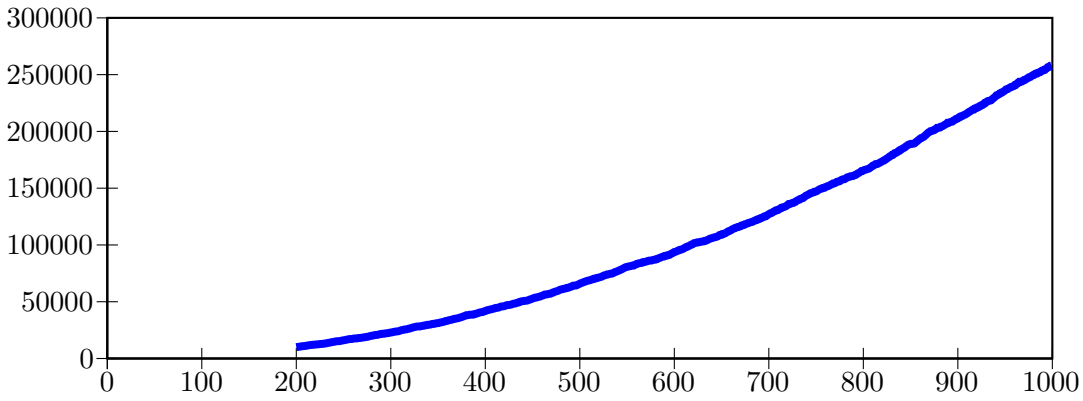
2.1 Example for nStep/xStep

The datafile `data.dat` contains 1000 data records. The thin blue line is the plot of all records with the plotstyle option `curve`.



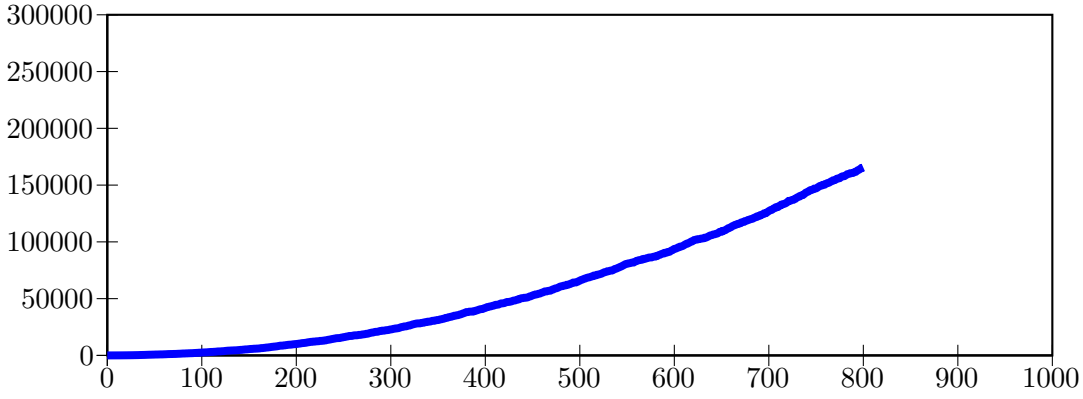

```
\readdata{\data}{examples/data.dat}
\psset{xunit=0.125mm,yunit=0.00015mm}
\begin{pspicture}(-80,-30000)(1000,310000)
\psaxes[axesstyle=frame,Dx=100,dx=100,Dy=50000,dy=50000](1000,300000)
\listplot[nStep=50,linewidth=3pt,linecolor=red,plotstyle=dots]{\data}
\listplot[linewidth=1pt,linecolor=blue]{\data}
\end{pspicture}
```

2.2 Example for nStart/xStart



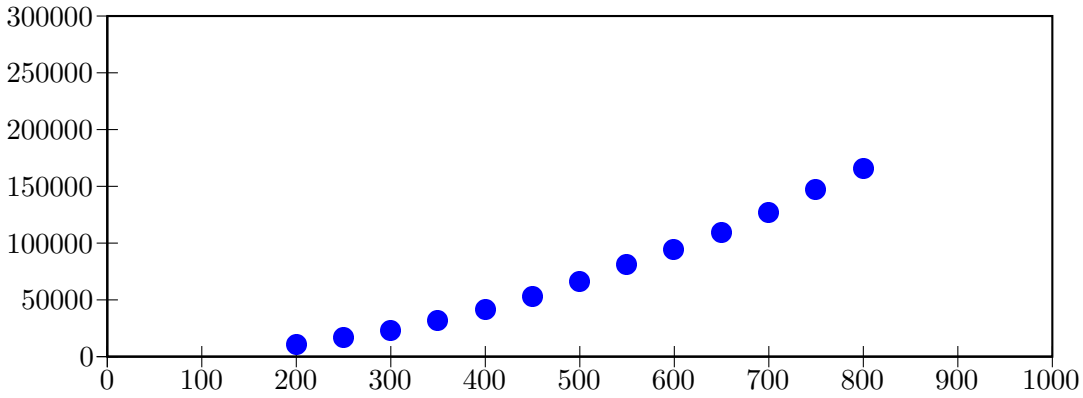

```
\readdata{\data}{examples/data.dat}
\psset{xunit=0.125mm,yunit=0.00015mm}
\begin{pspicture}(-80,-30000)(1000,310000)
\psaxes[axesstyle=frame,Dx=100,dx=100,Dy=50000,dy=50000](1000,300000)
\listplot[nStart=200,linewidth=3pt,linecolor=blue]{\data}
\end{pspicture}
```

2.3 Example for nEnd/xEnd




```
\readdata{\data}{examples/data.dat}
\psset{xunit=0.125mm,yunit=0.00015mm}
\begin{pspicture}(-80,-30000)(1000,310000)
\psaxes[axesstyle=frame,Dx=100,dx=100,Dy=50000,dy=50000](1000,300000)
\listplot[nEnd=800,linewidth=3pt,linecolor=blue]{\data}
\end{pspicture}
```

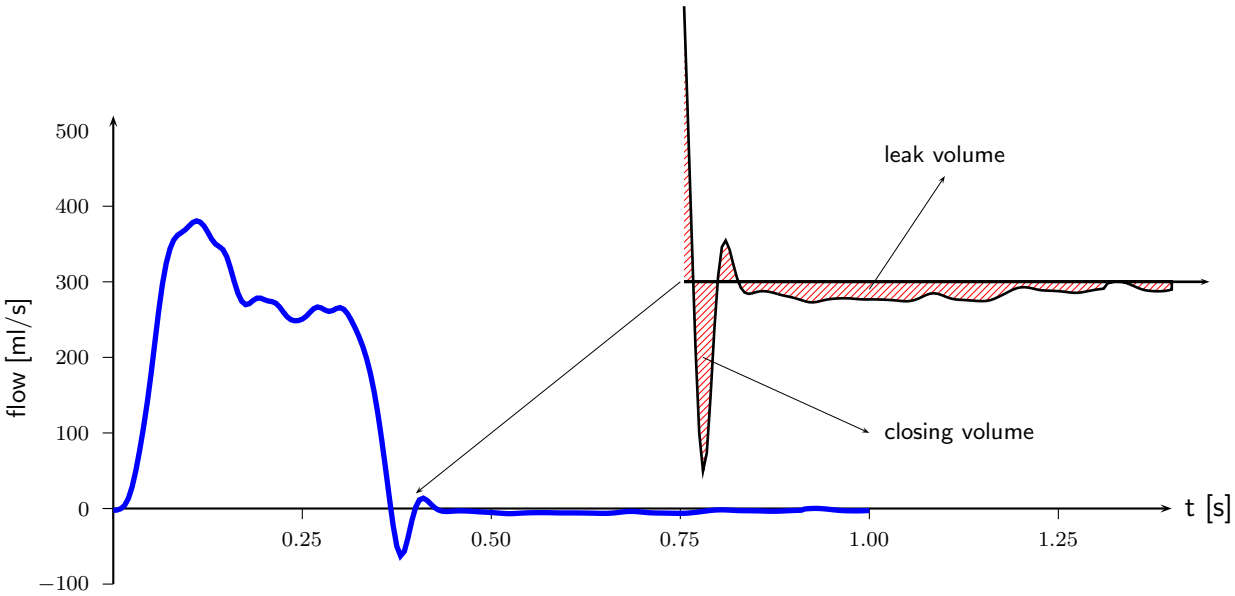
2.4 Example for all new options




```
\readdata{\data}{examples/data.dat}
\psset{xunit=0.125mm,yunit=0.00015mm}
\begin{pspicture}(-80,-30000)(1000,310000)
\psaxes[axesstyle=frame,Dx=100,dx=100,Dy=50000,dy=50000](1000,300000)
\listplot[nStart=200, nEnd=800, nStep=50,linewidth=3pt,linecolor=blue,%
^^Iplotstyle=dots]{\data}
\end{pspicture}
```

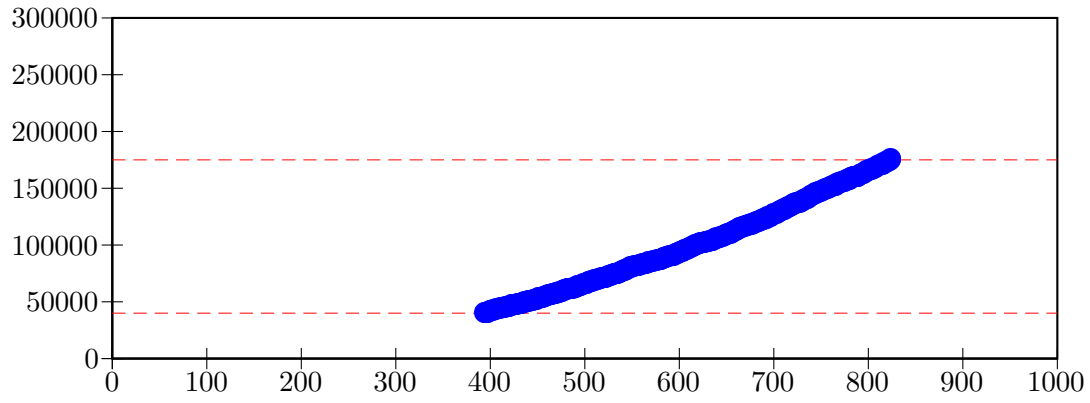
2.5 Example for `xStart`

This example shows the use of the same plot with different units and different `xStart` value. The blue curve is the original plot of the data records. To show the important part of the curve there is another one plotted with a greater `yunit` and a start value of `xStart=0.35`. This makes it possible to have a kind of a zoom to the original graphic.




```
\psset{xunit=10cm, yunit=0.01cm,xLabel={\scriptsize\sffamily},yLabel={\scriptsize\
  sffamily}}
\readdata{\data}{examples/data3.dat}
\begin{pspicture}(-0.1,-100)(1.5,700.0)
  \psaxes[Dx=0.25,Dy=100,dy=100\psyunit,tickstyle=bottom]{->}(0,0)(0,-100)(1.4,520)
  \uput[0](1.4,0){\textsf{t [s]}}
  \rput(-0.125,200){\rotateleft{\small\sffamily flow [ml/s]}}
  \listplot[linewidth=2pt, linecolor=blue]{\data}
  \rput(0.4,300){
    \pscustom[yunit=0.04cm, linewidth=1pt]{%
      \listplot[xStart=0.355]{\data}
      \psline(1,-2.57)(1,0)(0.355,0)
      \fill[fillstyle=hlines,fillcolor=gray,hatchwidth=0.4pt,hatchsep=1.5pt,hatchcolor=red
        ]%
      \psline[linewidth=0.5pt]{->}(0.7,0)(1.05,0)
    }%
  }
  \psline[linewidth=.01]{->}(0.75,300)(0.4,20)
  \psline[linewidth=.01]{->}(1,290)(1.1,440)
  \rput(1.1,470){\footnotesize\sffamily leak volume}
  \psline[linewidth=.01]{->}(0.78,200)(1,100)
  \rput[l](1.02,100){\footnotesize\sffamily closing volume}
\end{pspicture}
```

2.6 Example for yStart/yEnd




```
\readdata{\data}{examples/data.dat}
\psset{xunit=0.125mm,yunit=0.00015mm}
\begin{pspicture}(-80,-30000)(1000,310000)
  \psaxes[axesstyle=frame,Dx=100,dx=100,Dy=50000,dy=50000](1000,300000)
  \psset{linewidth=0.1pt, linestyle=dashed,linecolor=red}
  \psline(0,40000)(1000,40000)
  \psline(0,175000)(1000,175000)
  \listplot[yStart=40000, yEnd=175000,linewidth=3pt,linecolor=blue,plotstyle=dots]{\data}
\end{pspicture}
```

2.7 Example for plotNo/plotNoMax

By default the plot macros expect `x|y` data records, but when having data files with multiple values for y, like:

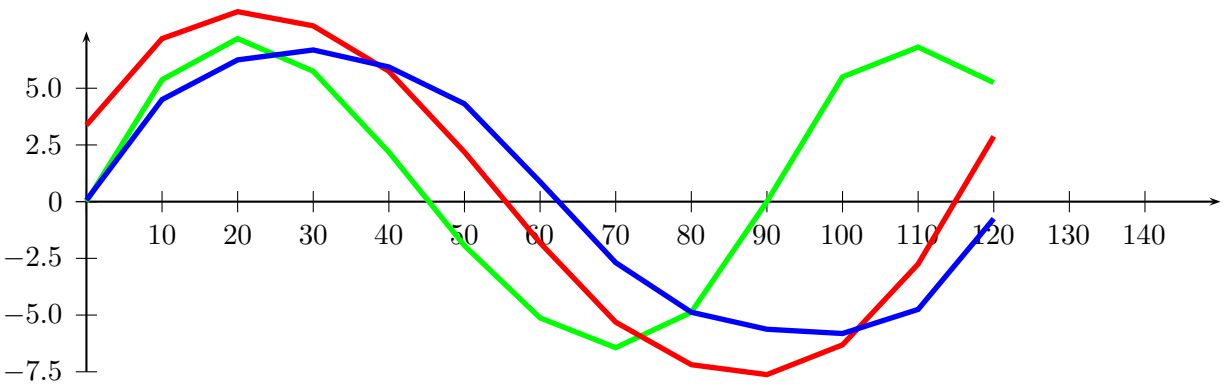
```
x y1 y2 y3 y4 ... yMax
x y1 y2 y3 y4 ... yMax
...
```

you can select the y value which should be plotted. The option `plotNo` marks the plotted value (default 1) and the option `plotNoMax` tells `pst-plot` how many y values are present. There are no real restrictions in the maximum number for `plotNoMax`.

We have the following data file:

```
[% file examples/data.dat
0    0    3.375    0.0625
10    5.375    7.1875    4.5
20    7.1875    8.375    6.25
30    5.75    7.75    6.6875
40    2.1875    5.75    5.9375
50    -1.9375    2.1875    4.3125
60    -5.125    -1.8125    0.875
70    -6.4375    -5.3125    -2.6875
80    -4.875    -7.1875    -4.875
90    0    -7.625    -5.625
100    5.5    -6.3125    -5.8125
110    6.8125    -2.75    -4.75
120    5.25    2.875    -0.75
]%
```

which holds data records for multiple plots (`x y1 y2 y3`). This can be plotted without any modification to the data file:




```
\readdata\Data{examples/dataMul.dat}
\psset{xunit=0.1cm, yunit=0.3cm}
\begin{pspicture}(0,-7.5)(150,10)
\psaxes[Dx=10,Dy=2.5]{->}(0,0)(0,-7.5)(150,7.5)
\psset{linewidth=2pt,plotstyle=line}
\listplot[linecolor=green,plotNo=1,plotNoMax=3]{\Data}
\listplot[linecolor=red,plotNo=2,plotNoMax=3]{\Data}
\listplot[linecolor=blue,plotNo=3,plotNoMax=3]{\Data}
\end{pspicture}
```

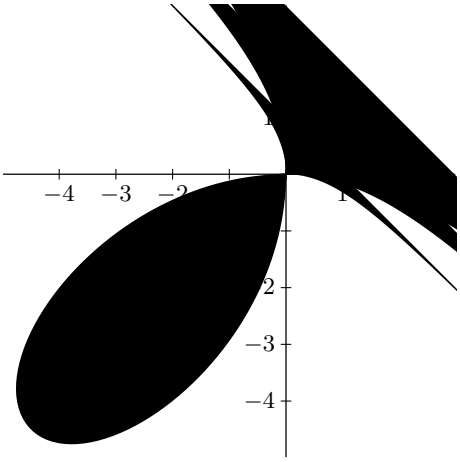
3 Polar plots

With the option `polarplot=false|true` it is possible to use `\psplot` in polar mode:

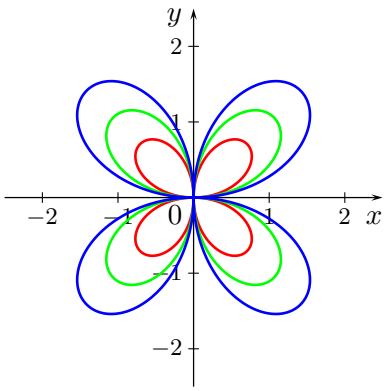
`\psplot[polarplot=true,...]{<start angle>}{<end angle>}{<r(alpha)>}`

The equation in PostScript code is interpreted as a function $r = f(\alpha)$, e.g. for the circle with radius 1 as $r = \sqrt{\sin^2 x + \cos^2 x}$:

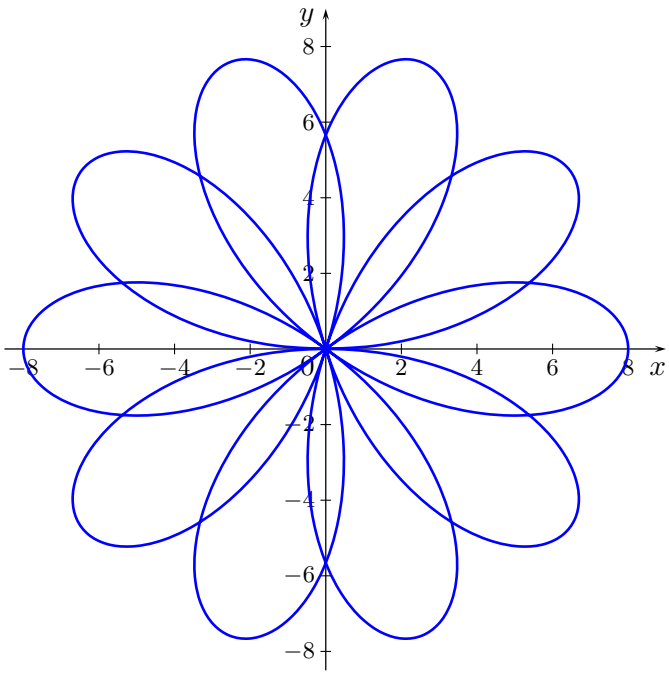
```
x sin dup mul x cos dup mul add sqrt
```




```
\resetPSTPlotOptions
\psset{plotpoints=200,unit=0.75}
\begin{pspicture}*(-5,-5)(3,3)
  \psaxes[labelsep=.75mm,xyLabel=\footnotesize,
    arrowlength=1.75,ticksize=2pt,%
    linewidth=0.17mm]{->}(0,0)(-4.99,-4.99)(3,3)
  \rput[Br](3,-.35){$x$}
  \rput[tr](-.15,3){$y$}
  \rput[Br](-.15,-.35){$O$}
  \psset{linewidth=.35mm,polarplot=true}
  \psplot[linecolor=red]{140}{310}{3 neg x sin mul x cos mul x sin 3 exp x cos 3 exp add
    div}
  \psplot[linecolor=cyan]{140}{310}{6 neg x sin mul x cos mul x sin 3 exp x cos 3 exp add
    div}
  \psplot[linecolor=blue]{140}{310}{9 neg x sin mul x cos mul x sin 3 exp x cos 3 exp add
    div}
\end{pspicture}
```




```
\resetPSTPlotOptions
\psset{plotpoints=200,unit=1}
\begin{pspicture}(-2.5,-2.5)(2.5,2.5)% Ulrich Dirr
 \psaxes[labelsep=.75mm,xyLabel=\footnotesize,%
  arrowlength=1.75, ticksize=2pt,linewidth=0.17mm]{->}(0,0)(-2.5,-2.5)(2.5,2.5)
  \rput[Br](2.5,-.35){$x$}
  \rput[tr](-.15,2.5){$y$}
  \rput[Br](-.15,-.35){$0$}
  \psset{linewidth=.35mm,plotstyle=curve,polarplot=true}
  \psplot[linecolor=red]{0}{360}{x cos 2 mul x sin mul}
  \psplot[linecolor=green]{0}{360}{x cos 3 mul x sin mul}
  \psplot[linecolor=blue]{0}{360}{x cos 4 mul x sin mul}
\end{pspicture}
```




```
\psset{plotpoints=200,unit=0.5}
\begin{pspicture}(-8.5,-8.5)(9,9)% Ulrich Dirr
\psaxes[Dx=2,dx=2,Dy=2,dy=2,labelsep=.75mm,xyLabel=\footnotesize,%
  arrowlength=1.75,ticksize=2pt,linewidth=0.17mm]{->}(0,0)(-8.5,-8.5)(9,9)
\rput[Br](9,-.7){$x$}
\rput[tr](-.3,9){$y$}
\rput[Br](-.3,-.7){$0$}
%
\psset{linewidth=.35mm,plotstyle=curve,polarplot=true}
\psplot[linecolor=blue]{0}{720}{8 2.5 x mul sin mul}
\end{pspicture}
```

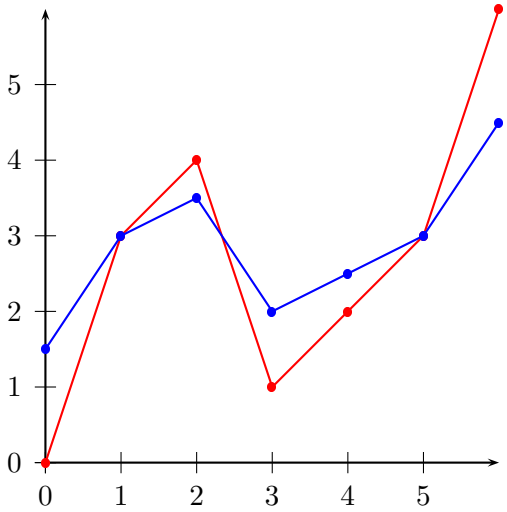
4 New commands and environments

4.1 \pstScalePoints

The syntax is

```
\pstScalePoints(xScale,xScale){xPS}{yPS}
```

`xScale,yScale` are decimal values as scaling factors, the `xPs` and `yPS` are additional PostScript code to the x- and y-values of the data records. This macro is only valid for the `\listplot` macro!




```
\def\data{0 0
1 3
2 4
3 1
4 2
5 3
6 6}
\begin{pspicture}(6,6)
\psaxes{->}(6,6)
\listplot[showpoints=true,linecolor=red]{\data}
\pstScalePoints(1,0.5){}{3 add}
\listplot[showpoints=true,linecolor=blue]{\data}
\end{pspicture}
```

Changes with `\pstScalePoints` are always global to all following `\listplot` macros. This is the reason why it is a good idea to reset the values at the end of the `pspicture` environment.

```
\pstScalePoints(1,1){}{}
```

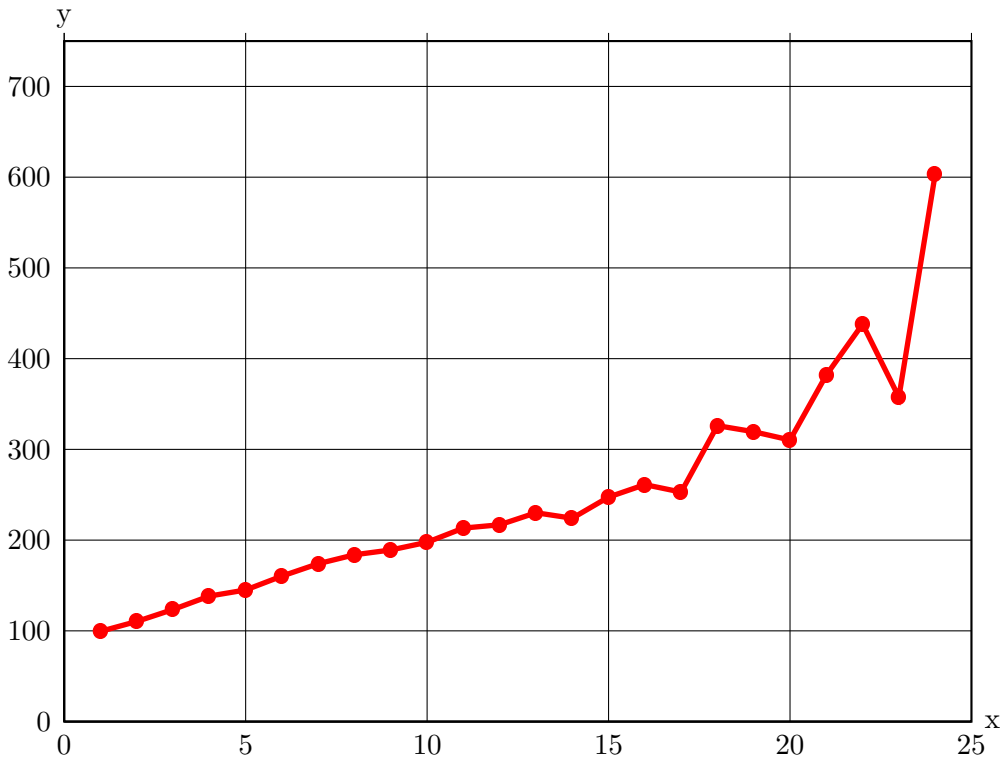
4.2 psgraph environment

This new environment does the scaling, it expects as parameter the values (without units!) for the internal coordinate system and the values of the physical width and height (with units!). The syntax is:

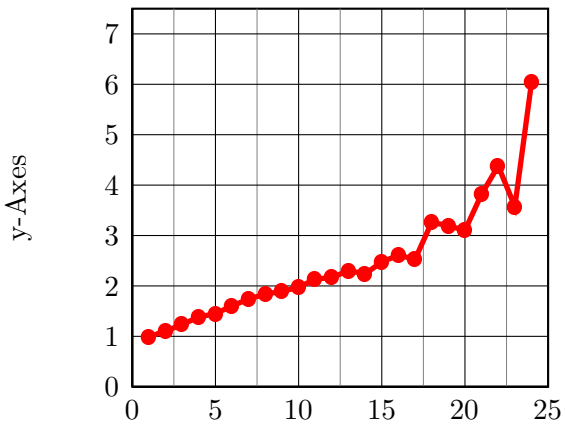
```
\psgraph[<options>](xMin,yMin)(xMax,yMax){xLength}{yLength}
...
\endpsgraph

\begin{psgraph}[<options>](xMin,yMin)(xMax,yMax){xLength}{yLength}
...
\end{psgraph}
```

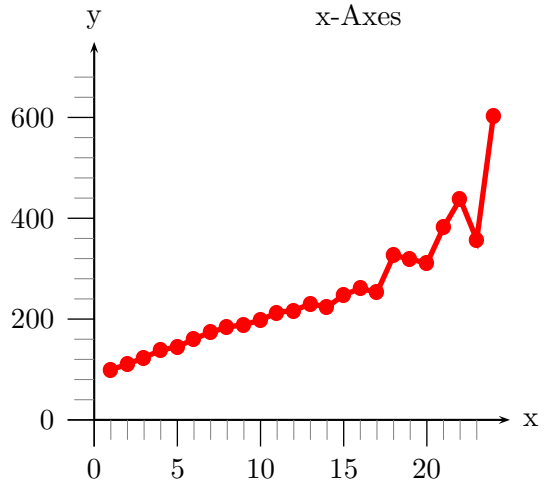
where the options are valid only for the the \psaxes macro. TEX has problems with the division of very big and very small values. This may cause some problems when using such values. The following example shows how the data values can be scaled (by the macro \pstSclaePoints) to get values for the \psgraph environment which causes no division error.



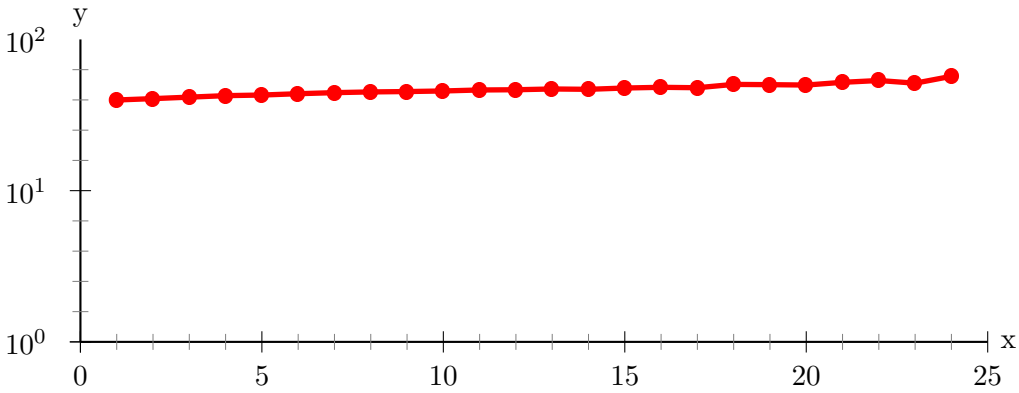

```
\readdata{\data}{demo1.dat}
\pstScalePoints(1,0.000001){}{}% (x,y){additional x operator}{y op}
\psset{llx=-0.5cm,lly=-1cm}
\psgraph[axesstyle=frame,xticksize=0 759,yticksize=0 25,%
   subticks=0,ylabelFactor={\cdot 10^6},%
   Dx=5,dy=100\psyunit,Dy=100](0,0)(25,750){12cm}{9cm} % parameters
  \listplot[linecolor=red, linewidth=2pt, showpoints=true]{\data}
\endpsgraph
```



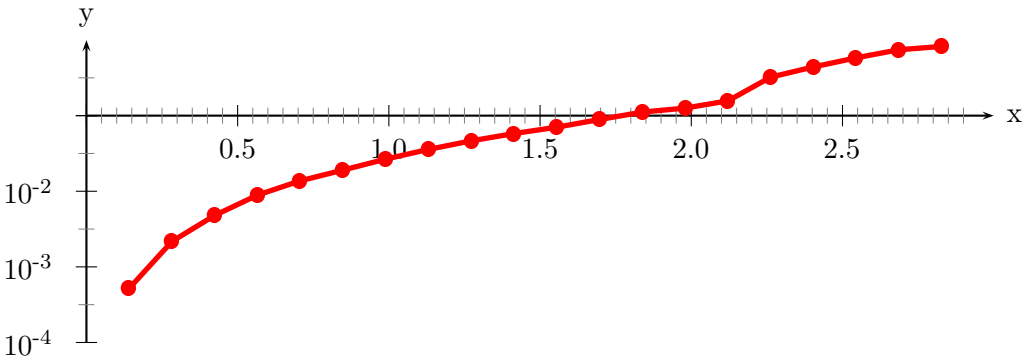

```
\readdata{\data}{demo1.dat}
\psset{xAxisLabel=x-Axes,yAxisLabel=y-Axes,
  llx=-1cm,%
  xAxisLabelPos={3cm,-1cm},yAxisLabelPos
    ={-1.5cm,2.5cm}}
\pstScalePoints(1,0.00000001){}{}
\begin{psgraph}[axesstyle=frame,xticksize=0
  7.5,yticksize=0 25,subticksize=1,%
    ylabelFactor={\cdot 10^8},Dx=5,Dy=1,
      xsubticks=2](0,0)(25,7.5){5.5cm}{5cm}
 \listplot[linecolor=red, linewidth=2pt,
   showpoints=true]{\data}
\end{psgraph}
```



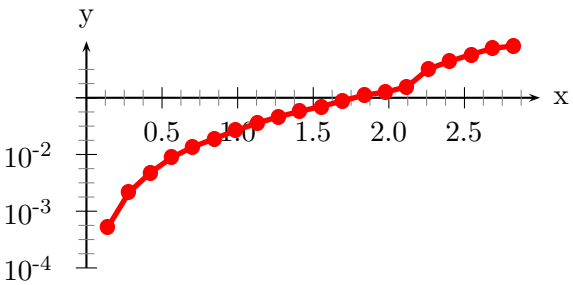

```
\readdata{\data}{demo1.dat}
\psset{llx=-0.5cm,lly=-1cm}
\pstScalePoints(1,0.000001){}{}
\psgraph[arrows=->,Dx=5,dy=200\psyunit,Dy=200,%
   subticks=5,ticksize=-10pt 0,tickwidth=0.5pt,%
   subtickwidth=0.1pt](0,0)(25,750){5.5cm}{5cm}
\listplot[linecolor=red,linewidth=2pt,showpoints=true,]{\data}
\endpsgraph
```



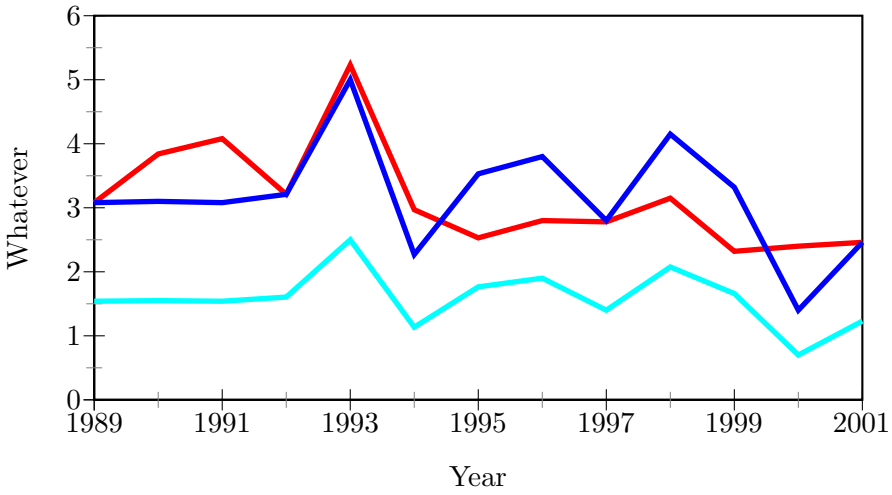

```
\pstScalePoints(1,0.2){}{log}
\psset{lly=-0.75cm}
\psgraph[ylogBase=10,Dx=5,Dy=1,subticks=5](0,0)(25,2){12cm}{4cm}
  \listplot[linecolor=red, linewidth=2pt, showpoints=true]{\data}
\endpsgraph
```



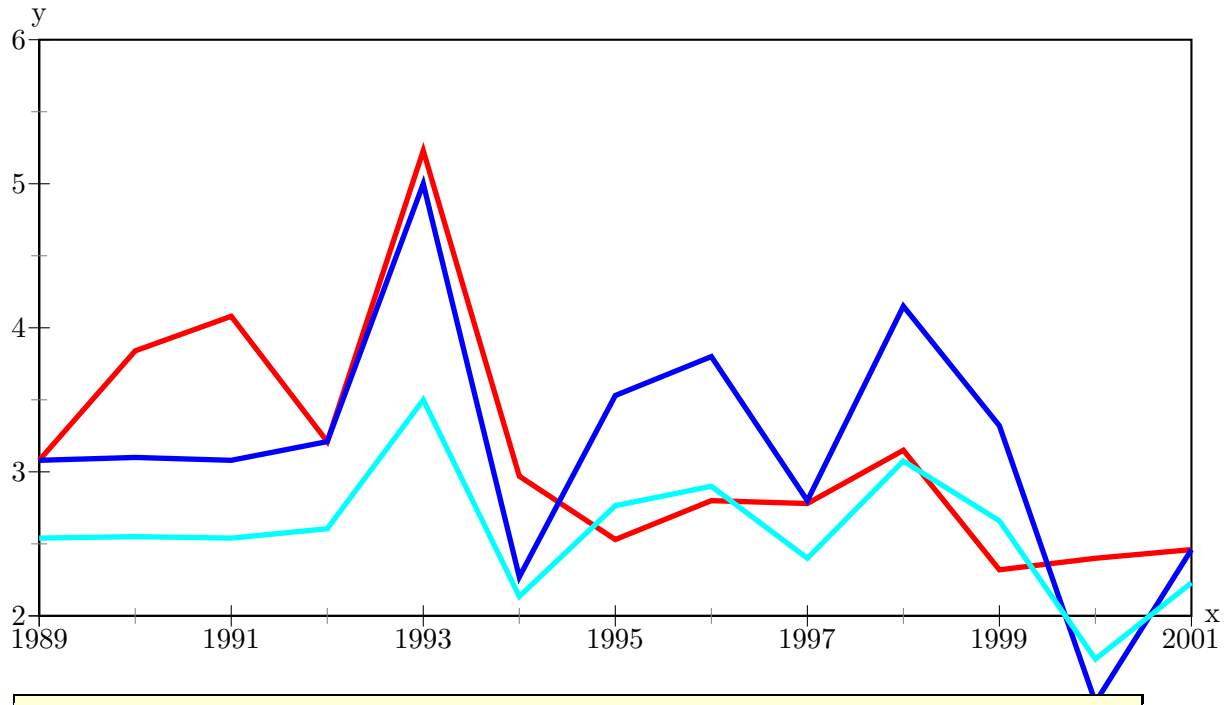

```
\readdata{\data}{demo0.dat}
\pstScalePoints(1,1){}{log}
\begin{psgraph}[arrows=->,Dx=0.5,ylogBase=10,Oy=-1,xsubticks=10,%
    ysubticks=2](0,-3)(3,1){12cm}{4cm}
  \listplot[linecolor=red, linewidth=2pt, showpoints=true]{\data}
\end{psgraph}
```




```
\readdata{\data}{demo0.dat}
\pstScalePoints(1,1){}{log}
\psgraph[arrows=->,Dx=0.5,ylogBase=10,Oy=-1,
  subticks=4](0,-3)(3,1){6cm}{3cm}
  \listplot[linecolor=red, linewidth=2pt,
    showpoints=true]{\data}
\endpsgraph
```

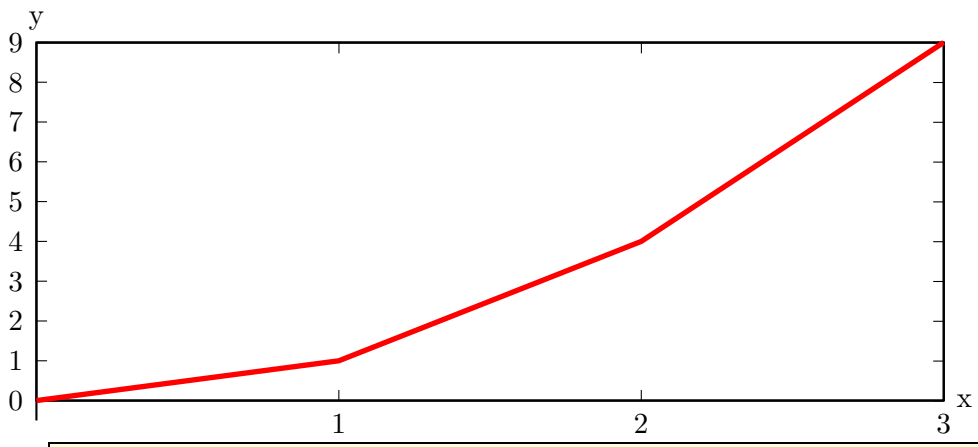



```
\readdata{\data}{demo2.dat}%
\readdata{\dataII}{demo3.dat}%
\pstScalePoints(1,1){1989 sub}{}
\psset{llx=-0.5cm,lly=-1cm, xAxisLabel=Year,yAxisLabel=Whatever,%
    xAxisLabelPos={2in,-0.4in},yAxisLabelPos={-0.4in,1in}}
\psgraph[axesstyle=frame,Dx=2,Ox=1989,subticks=2](0,0)(12,6){4in}{2in}%
  \listplot[linecolor=red,linewidth=2pt]{\data}
  \listplot[linecolor=blue,linewidth=2pt]{\dataII}
  \listplot[linecolor=cyan,linewidth=2pt,yunit=0.5]{\dataII}
\endpsgraph
```




```
\psset{llx=-0.5cm,lly=-0.75cm}
\pstScalePoints(1,1){1989 sub}{2 sub}
\begin{psgraph}[axesstyle=frame,Dx=2,Ox=1989,Oy=2,subticks=2](0,0)(12,4){6in}{3in}%
  \listplot[linecolor=red,linewidth=2pt]{\data}
  \listplot[linecolor=blue,linewidth=2pt]{\dataII}
  \listplot[linecolor=cyan,linewidth=2pt,yunit=0.5]{\dataII}
\end{psgraph}
```

An example with ticks on every side of the frame:

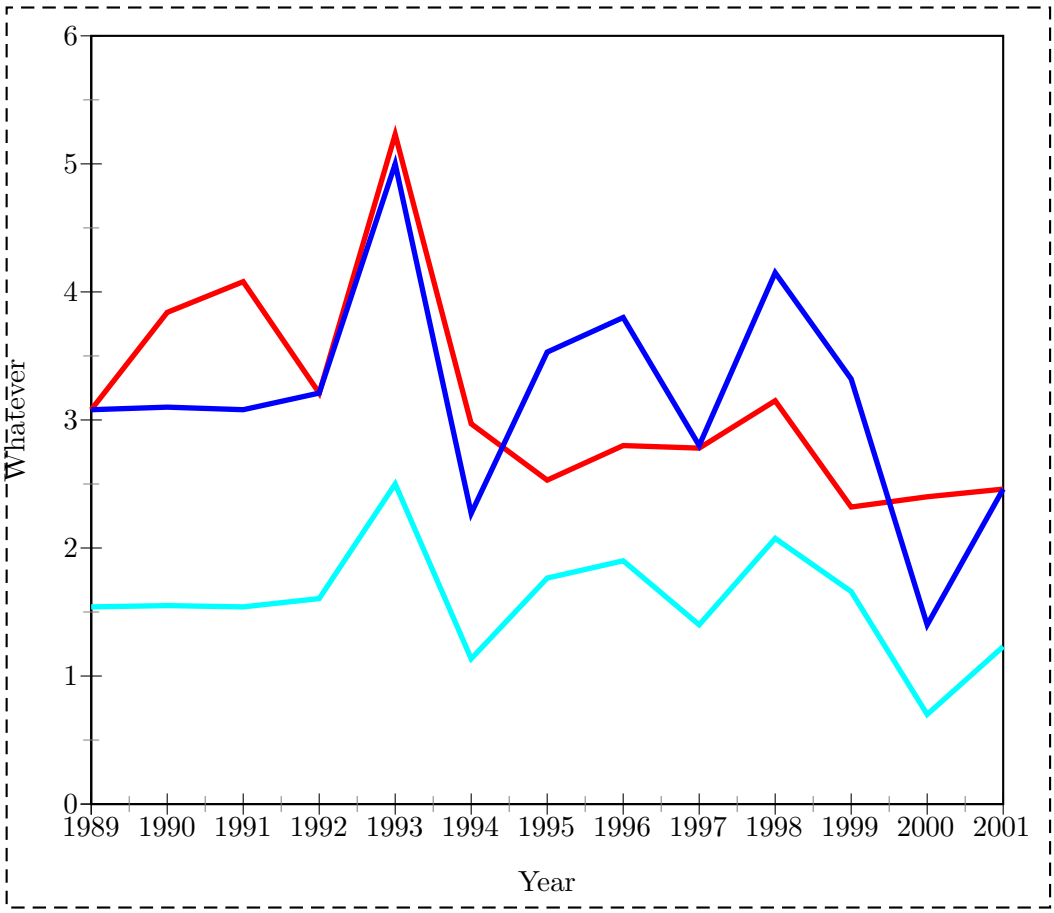



```
\def\data{0 0 1 1 2 4 3 9}
\begin{psgraph}[axesstyle=frame,tickstyle=top](0,-0.5)(3.0,9.0){12cm}{5cm}
  \psaxes[axesstyle=frame,labels=none,tickstyle=bottom](3,9)(0,0)(3,9)
  \listplot[linecolor=red,linewidth=2pt]{\data}
\end{psgraph}
```

4.2.1 The new options

name	default	meaning
xAxisLabel	x	label for the x-axis
yAxisLabel	y	label for the y-axis
xAxisLabelPos	{}	where to put the x-label
yAxisLabelPos	{}	where to put the y-label
llx	0pt	trim for the lower left x
lly	0pt	trim for the lower left y
urx	0pt	trim for the upper right x
ury	0pt	trim for the upper right y

There is one restriction in using the trim parameters, they must been set **before** psgraph is called. They are senseless, when using as parameters of psgraph itself.




```
\psset{llx=-1cm,lly=-1.25cm,urx=0.5cm,ury=0.1in,xAxisLabel=Year,%
  yAxisLabel=Whatever,xAxisLabelPos={.4\linewidth,-0.4in},%
  yAxisLabelPos={-0.4in,2in}}
\pstScalePoints(1,1){1989 sub}{}
\psframebox[linestyle=dashed,boxsep=0pt]{%
\begin{psgraph}[axesstyle=frame,0x=1989,subticks=2](0,0)(12,6){0.8\linewidth}{4in}%
 \listplot[linecolor=red,linewidth=2pt]{\data}%
 \listplot[linecolor=blue,linewidth=2pt]{\dataII}%
 \listplot[linecolor=cyan,linewidth=2pt,yunit=0.5]{\dataII}%
\end{psgraph}%
}
```

4.3 \resetPSTPlotOptions

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\resetPSTPlotOptions{%
  \@zero=0%
  \pstScalePoints(1,1){}{}% reset
  \psset{%
       infix=none,%
       xyAxes=true,
       xyDecimals={},%
       xyLabel={},
       xylogBase={},
       logLines=none,
       xlabelFactor=\relax,ylabelFactor=\relax,
       nStep=1,nStart=0,nEnd={},%
       xStep=0,yStep=0,xStart={},xEnd={},yStart={},yEnd={},comma=false,%
       plotNo=1,plotNoMax=1,
       xAxisLabel=x,yAxisLabel=y,
       yAxisLabelPos=\@empty,xAxisLabelPos=\@empty,
       plotstyle=line,
       plotpoints=50,
       polarplot=false,
       method=default, whichabs=default, whichord=default,%
       plotfuncx=default, plotfuncy=default, buildvector=false,
       VarStep=default,
       dimen=middle,% remark of ML
       ticks=all,
       labels=all,
       Ox=0,Dx=1,dx=0,Oy=0,Dy=1,dy=0,
       showorigin=true,
       xticksize=-4pt 4pt,yticksize=-4pt 4pt,
       tickstyle=full,
       subticksize=0.75,subticks=1,tickcolor=black,ticklinestyle=solid,%
       subticklinestyle=solid,%
       subtickcolor=gray,%
       tickwidth=0.5\pslinewidth,%
       subtickwidth=0.25\pslinewidth,
       axesstyle=axes,
       barwidth=0.25cm,
       xAxisLabel=x,yAxisLabel=y,
       yAxisLabelPos=\@empty,xAxisLabelPos=\@empty,
       llx=\z@, lly=\z@, urx=\z@, ury=\z@}% prevents rounding errors
}
```

5 Credits

Denis Girou | Timothy Van Zandt

References

[1] Denis Girou. Présentation de PSTricks. *Cahier GUTenberg*, 16:21–70, April 1994.

[2] Michel Goosens, Frank Mittelbach, and Alexander Samarin. *The LaTeX Graphics Companion*. Addison-Wesley Publishing Company, Reading, Mass., 1997.

[3] Laura E. Jackson and Herbert Voß. Die plot-funktionen von `pst-plot`. *Die TeXnische Komödie*, 2/02:27–34, June 2002.

[4] Nikolai G. Kollock. *PostScript richtig eingesetzt: vom Konzept zum praktischen Einsatz*. IWT, Vaterstetten, 1989.

[5] Herbert Voß. *Chaos und Fraktale selbst programmieren: von Mandelbrotmengen über Farbmanipulationen zur perfekten Darstellung*. Franzis Verlag, Poing, 1994.

[6] Herbert Voß. Die mathematischen Funktionen von PostScript. *Die TeXnische Komödie*, 1/02, March 2002.

[7] Timothy van Zandt. *PSTricks - PostScript macros for generic TeX*. http://www.tug.org/application/PSTricks, 1993.

[8] Timothy van Zandt. *`multido.tex` - a loop macro, that supports fixed-point addition*. CTAN:/graphics/pstricks/generic/multido.tex, 1997.

[9] Timothy van Zandt. *`pst-plot`: Plotting two dimensional functions and data*. CTAN:graphics/pstricks/generic/pst-plot.tex, 1999.

[10] Timothy van Zandt and Denis Girou. Inside PSTricks. *TUGboat*, 15:239–246, September 1994.