

# PstChart Demonstrations

## More sophisticated usage of PstChart

Denis GIROU\*

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**Abstract:** This document try to demonstrate complementary examples of more sophisticated usage of **PstChart**, a program to generate business charts (bar, line and pie) in (A)T<sub>E</sub>X + PostScript with PStricks [PstChart].

You are encouraged to contribute with your own *real* examples to illustrate other aspects not already emphasized in my documents.

The **PstChart** Web page is on <http://www.tug.org/applications/PStricks/PstChart>

## 1 Annotations and chart inside another chart<sup>1</sup>

Using the `input-begin` and `input-end` parameters, we can include other commands before or after to draw the chart. We can use this possibility for everything we can think, and for instance to include another charts on the main one. Here we insert the magnification of the first data values to emphasize what happen in this area.

Main points to comment in this example are:

- The ellipse is drawn in a file called by the `input-begin` parameter because with `input-end` this would erase the corresponding area of the data curve.
- When inserting the small chart, we must take care to reset the unit before (`\psset{unit=1cm}`), otherwise scaling will be incoherent.
- Coordinates for inclusion of the small chart (160,7) and the annotations for the small chart and for the first and last values (1,4 ; 8,0.4 ; 400,8.54 ; etc.) are relative to the main data values.

**PstChart** call for main chart is:

```
pstchart.sh hlines dim-x=12 dim-y=6 no-showpoints max=10 \  
  coef-bottom-labels=70 data-gap=25 \  
  nb-major-ticks=5 coef-linewidth=0.2 \  
  input-begin=vpp.beg input-end=vpp.end \  
  center figure < vpp.dat
```

**PstChart** call for small chart is:

```
pstchart.sh hlines dim-x=4 dim-y=2 no-showpoints max=0.8 \  
  coef-bottom-labels=5 data-gap=0.25 \  
  nb-major-ticks=4 no-multido-graduations \  
  < vpp-beg.dat > vpp-beg.tmp
```

---

\*CNRS/IDRIS – Centre National de la Recherche Scientifique / Institut du Développement et des Ressources en Informatique Scientifique – France – <Denis.Girou@idris.fr>.

<sup>1</sup>By Denis GIROU.

With for file vpp.beg:

```
% vpp.beg
\psellipse*[linecolor=Pink](8,0.4)(10,0.4)
```

**File VPP/vpp.beg**

and for file vpp.end:

```
% vpp.end
% Magnified graph for the first values
\rput(160,7){\psset{unit=1cm}\input{vpp-beg.tmp}}
\psline[linecolor=Pink]{->}(8,0.5)(160,5.3)
% Values
\newcommand{\Value}[5]{%
\psline[linestyle=dotted,linewidth=1pt]{->}(#2,#3)(#4,#5)
\rput(#2,#3){\psshadowbox[fillstyle=solid,fillcolor=LemonChiffon]{\small #1}}}
% First and last values
\Value{0.11}{1}{4}{1}{0.11}
\Value{\shortstack{8.54\\\footnotesize ($\Rightarrow$ ratio 78)}}{
{400}{8.54}{512}{8.54}}
```

**File VPP/vpp.end**

The data file vpp-beg.dat for small chart is (the one for main chart has too many lines to be shown here, but has no surprise):

```
BACKGROUND ||| solid | Pink
GRADUATIONS | 2 || dotted
0.108 | 1
0.177
0.164
0.397 | 4
0.164
0.232
0.203
0.438 | 8
0.164
0.193
0.180
0.348 | 12
0.162
0.219
0.164
0.735 | 16
```

**File VPP/vpp-beg.dat**

And the resulting chart is:

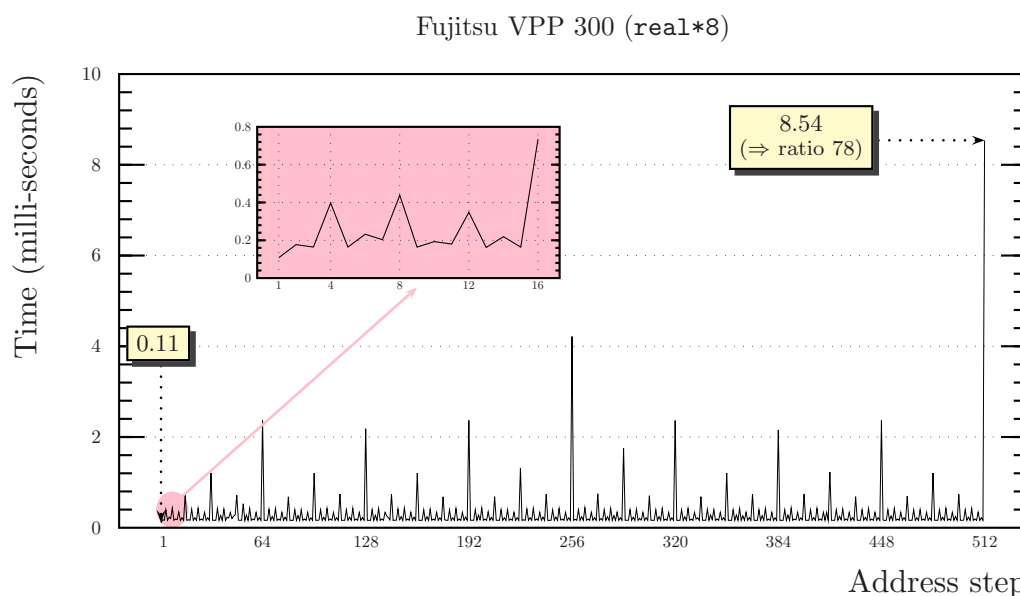


Figure 1: Time measurements for a scalar product on 65536 elements, for a varying position of these elements in memory, showing the effect of an interleaving bank memory

## 2 Pie chart with numerous slices and 3d effect<sup>2</sup>

In this example, we have numerous slices in the pie chart and we add a simple 3d effect.

Main points to comment in this example are:

- As we have numerous slices, with must give explicitly the positions of labels (external ones and those automatically printed for percentages).
- 3d effect is obtained using the `\pstilt` macro and the special `##` convention.

**PstChart** call is:

```
pstchart.sh pie dim=10 print-percentages \
  coef-bottom-labels=2.5 coef-top-labels=2.5 \
  < nqs.dat
```

---

<sup>2</sup>By Denis GIROU.

The data file nqs.dat is:

```
# CPU time by NQS classes

##\pstilt{75}{%
##\pscicle*[linecolor=lightgray](5.5,6.8){5}

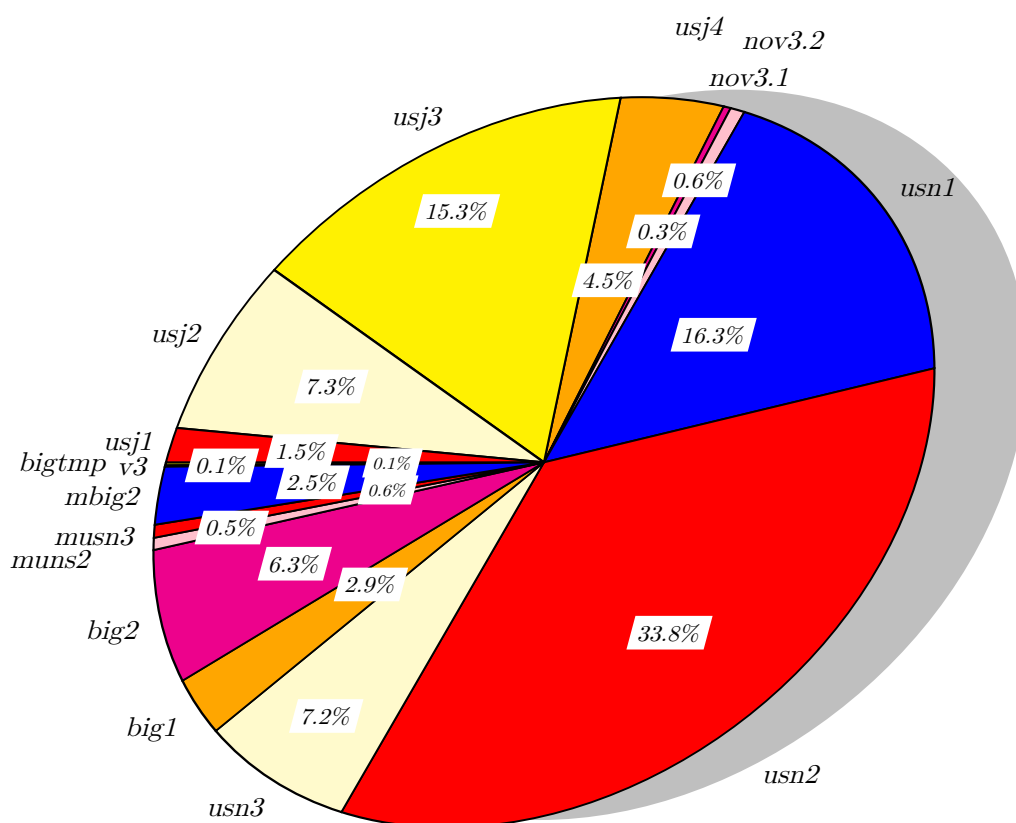
# Aspect of pie slices
ASPECT | solid | Red
ASPECT | solid | LemonChiffon
ASPECT | solid | Yellow
ASPECT | solid | Orange
ASPECT | solid | Magenta
ASPECT | solid | Pink
ASPECT | solid | Blue
ASPECT | solid | Red
ASPECT | solid | LemonChiffon
ASPECT | solid | Orange
ASPECT | solid | Magenta
ASPECT | solid | Pink
ASPECT | solid | Red
ASPECT | solid | Blue
ASPECT | solid | Green
ASPECT | solid | Yellow

# Value | External label ||| Ext. Pos. |||| Int. Pos.
1.501116 | usj1 ||| 0.95 |||| 1.3
7.329406 | usj2 ||| 0.95 |||| 1.3
15.284410 | usj3 ||| 0.95 |||| 1.6
4.469987 | usj4 ||| 1.05 |||| 1
0.322117 | nov3.1 ||| 0.95 |||| 1.3
0.639742 | nov3.2 ||| 1.05 |||| 1.6
16.304912 | usn1 ||| 0.95 |||| 1
33.797193 | usn2 ||| 1.05 |||| 1.3
7.203131 | usn3 ||| 0.95 |||| 1.6
2.946876 | big1 ||| 0.95 |||| 1
6.338700 | big2 ||| 0.95 |||| 1.3
0.546649 | muns2 ||| 1.05 |||| 1.6
0.582520 | musn3 ||| 0.95 |||| 0.8
2.542292 | mbig2 ||| 0.95 |||| 1.2
0.057714 | v3 ||| 0.95 |||| 1.7
0.133234 | bigtmp ||| 1.05 |||| 0.8

##}
```

File NQS/nqs.dat

And the resulting chart is:



### 3 Bar charts with patterns<sup>3</sup>

This bar chart use special patterns to fill the bars. The original one is rather complicated, but produce pleasant effect.

Main points to comment in this example are:

- This possibility was introduced in version 0.21 of **PstChart**, using the `pst-fill` extension of PSTricks 97, with the special `tiling` option.
- The pattern (kangaroo) was translated in PSTricks using one done by Emmanuel CHAILLOUX and Guy COUSINEAU for the MLgraph system, reproduced from an original picture by Raoul RABA.

**PstChart** call for main chart is:

```
pstchart.sh vbar dim-x=12 dim-y=10 data-change-colors \
  coef-linewidth=0 coef-bar-size=1.3 \
  interval-major-ticks=500 \
  < kg.dat
```

<sup>3</sup>By Denis GIROU.

The data file kg.dat is:

```
#      | Title                                                    | Scale
TITLE | Fantaisist repartition of kangaroos in the world (in thousands) | 2

#      ||| Background style | B. color
BACKGROUND ||| solid          | LemonChiffon

# Aspects of the sets
#      | Style  ||||||| Pattern
ASPECT | pattern ||||||| \Kangaroo{red}
ASPECT | pattern ||||||| \Kangaroo{yellow}
ASPECT | pattern ||||||| \Kangaroo{cyan}
ASPECT | pattern ||||||| \Kangaroo{magenta}
ASPECT | pattern ||||||| \Kangaroo{green}

# Value | Bottom label
1800   | Oceania
800    | Africa
550    | Asia
500    | America
200    | Europe
```

File KG/kg.dat

with for definition of the pattern:

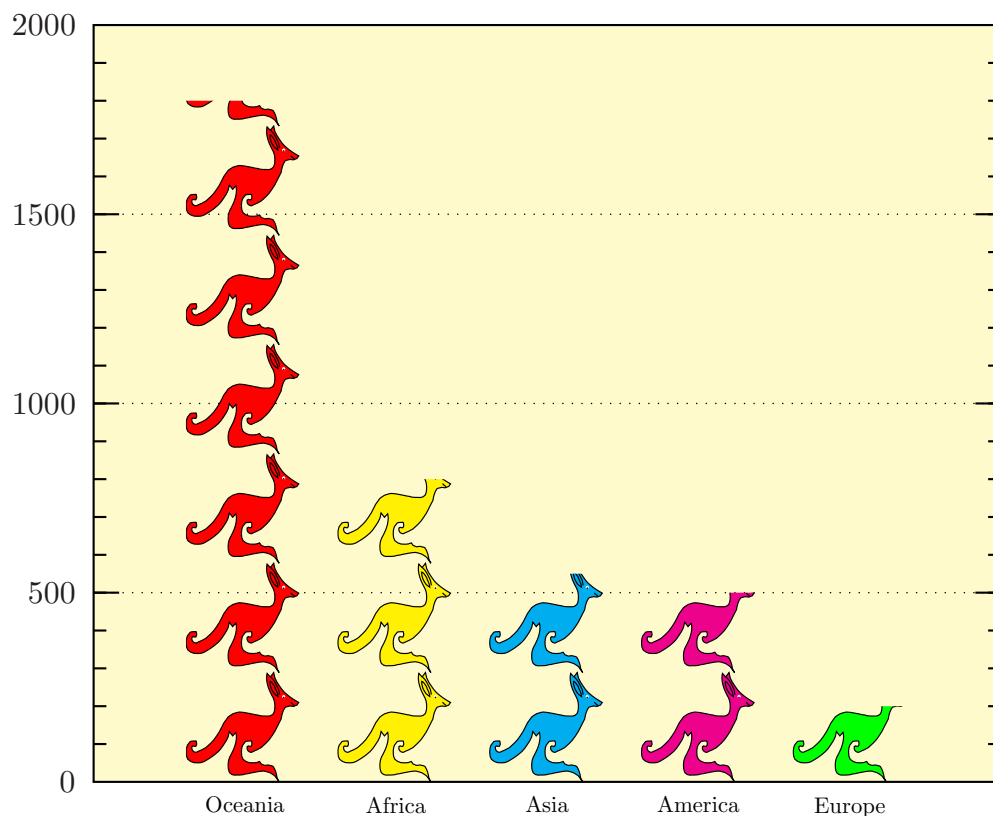
```
% Translation in PSTricks by Denis Girou from the one drawn
% by Emmanuel Chailloux and Guy Cousineau for the MLgraph system
% (see /anonymous@ftp.ens.fr:/pub/unix/lang/MLgraph/version-2.0/
%      documentations/draft-primer-ml.ps.gz)
% The kangaroo itself is reproduce from an original picture from Raoul Raba

\newcommand{\Kangaroo}[1]{%
\psset{xunit=0.006784,yunit=0.00735,linewidth=0.01}
\begin{pspicture}(-63.5,0)(79,126)
% Body
\pspolygon[fillstyle=solid,fillcolor=#1]%
(52.5,68)(55,72.5)(55.8,76.5)(56.8,79.8)(58.2,83)(60,85.8)(61.5,86.5)
(64,87)(66,87.5)(67.8,87.3)(70,87)(71.5,87.3)(73,88)(74.7,88.5)
(76,90.3)(77,91.5)(72.8,93.8)(69,96)(64.5,99)(59.4,103)(56.2,106.3)
(53,110.5)(49.5,115.5)(47.2,119.9)(45.7,126)(43.2,123)(41.5,121)(37.5,125)
(37,122.5)(36.8,120)(37,117)(37.6,113.5)(38.6,110)(40,106.3)(42,102.3)
(43.5,99.5)(45,97)(46.2,94)(46.8,91.7)(47.2,88)(47,83.5)(46.3,80.8)
(45.3,78.5)(42.5,76.5)(39.5,75.8)(36,75.9)(33,75.9)(29,76.2)(26,77)
(22.3,77.5)(18,78.4)(12.8,79.3)(8.6,80)(5.5,80.3)(3,80.5)(0,80)
(-5.2,78.5)(-9,76.3)(-11.2,74.8)(-13,72.5)(-16.5,68)(-16.5,68)(-19.5,62.5)
(-22,58)(-25.5,53)(-29,48.5)(-32.5,45)(-36,42)(-39,39.5)(-44,37)
(-49,35)(-51,34)(-53.5,34.5)(-55.5,36)(-56.5,38)(-56.5,40.5)(-55,41.5)
(-53.5,41)(-51.5,41)(-50.5,43)(-50.5,44.5)(-51,47)(-51.5,47.2)(-56.5,47)
(-58.5,46.5)(-60,44.7)(-62,42.3)(-63,39.5)(-63.5,36.3)(-63.5,33)(-63.1,29.5)
(-61.5,26)(-58,23.6)(-54,22.2)(-50.7,22)(-47.5,22)(-44.5,22.3)(-41,23.5)
(-36.8,25.8)(-33,28)(-28.5,31)(-23.4,35)(-20.2,38.3)(-17,42.5)(-13.5,47.5)
(-11.2,51.9)(-9.7,58)(-7.2,55)(-5.5,53)(-1.5,57)(-1,54.5)(-0.8,52)
(-1,49)(-1.6,45.5)(-2.6,42)(-4,38.3)(-6,34.3)(-7.5,31.5)(-9,29)
(-10.2,26)(-10.8,23.7)(-11.2,20)(-11,15.5)(-10.3,12.8)(-9.3,10.5)(-6.5,8.5)
(-3.5,7.8)(0,7.9)(3,7.9)(7,8.2)(10,9)(13.7,9.5)(18,10.4)
(23.2,11.3)(27.4,12)(30.5,12.3)(33,12.5)(36,12)(41.2,10.5)(45,8.3)
(47.2,6.8)(49,4.5)(52.5,0)(50,4.5)(49.2,8.5)(48.2,11.8)(46.8,15)
(45,17.8)(43.5,18.5)(41,19)(39,19.5)(37.2,19.3)(35,19)(33.5,19.3)
(32,20)(30.3,20.5)(29,22.3)(28,23.5)(28,23.5)(24.5,22.3)(21.5,22)
(18.3,22)(15,22.2)(11,23.6)(7.5,26)(5.9,29.5)(5.5,33)(5.5,36.3)
(6,39.5)(7,42.3)(9,44.7)(10.5,46.5)(12.5,47)(17.5,47.2)(18,47)
(18.5,44.5)(18.5,43)(17.5,41)(15.5,41)(14,41.5)(12.5,40.5)(12.5,38)
(13.5,36)(15.5,34.5)(18,34)(20,35)(25,37)(30,39.5)(33,42)
(36.5,45)(40,48.5)(43.5,53)(47,58)(49.5,62.5)(52.5,68)
% Eye
\pscircle*[linecolor=white](58.2,98.3){2\psxunit}
\pscircle*(58.2,97.3){\psxunit}
% Mouth
\psline(71.5,88)(70,89.3)(68.5,90.3)(67,91.9)
% Tear
\psline(42,121)(45,118)(47,115.3)(48.5,112.7)(50,110)(51.8,106.5)
(52.5,103.7)(53,100.5)
\pspolygon(41.2,115.8)(43.2,114.7)(45,112.5)(47,109.8)(48,107)(49.5,104.2)
(50.5,101.6)(51,98.5)(47.7,100.6)(46,102.2)(44.8,104)(43.5,106)
(42.5,108)(41.7,110.5)(41,113.2)
\end{pspicture}}
\endinput
```

File KG/kg-def.tex

The resulting chart is:

Fantaisist repartition of kangaroos in the world (in thousands)



#### 4 3d presentation of a serie of charts<sup>4</sup>

All the charts are simple ones. We just use the `\ThreeDput` macro to show them in a 3d view.

Main points to comment in this example are:

- Charts can also be considered as *graphical objects* and can be manipulated by other (L)T<sub>E</sub>X and PSTricks commands. Here we put the charts in a 3d perspective.

**PstChart** call for the charts are:

```
pstchart.sh hlines dim-x=8 coef-bottom-labels=0.6 max=500 < jan.dat > jan.pst
.....
pstchart.sh hlines dim-x=8 coef-bottom-labels=0.6 max=500 < jun.dat > jun.pst
```

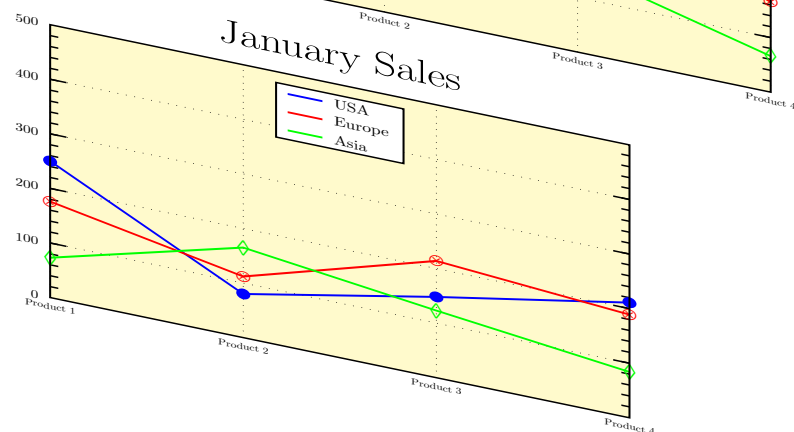
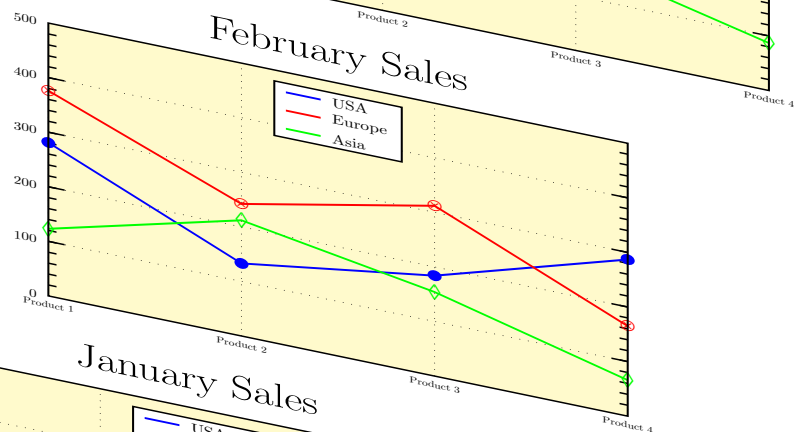
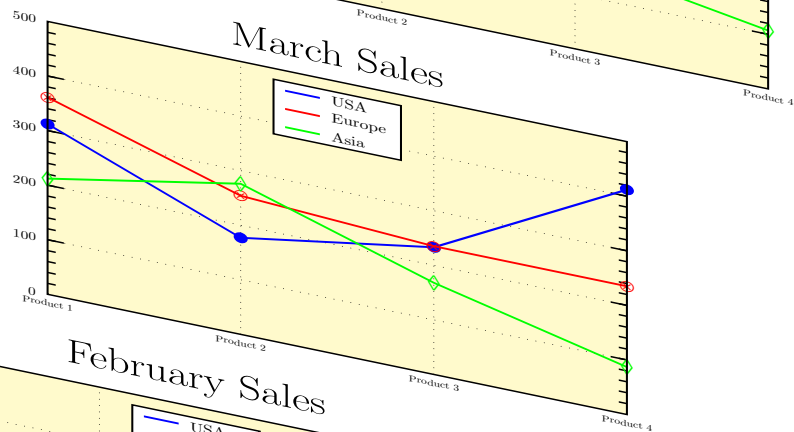
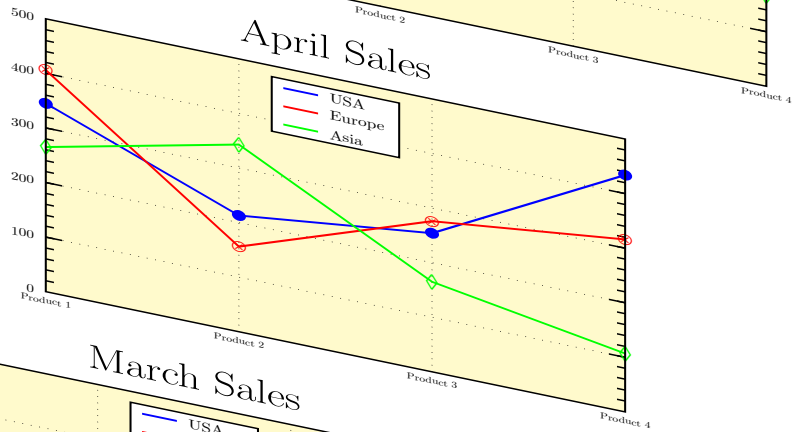
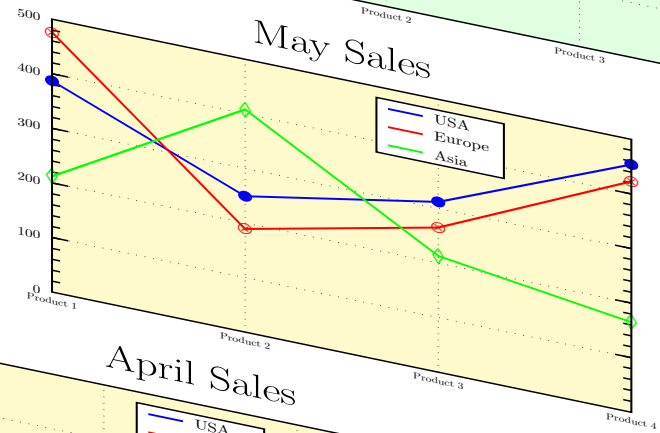
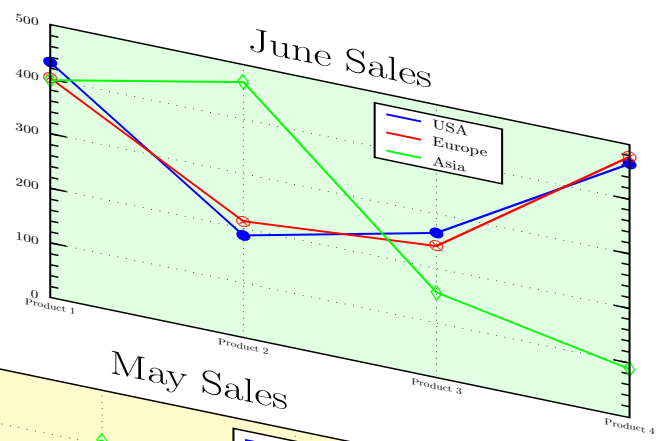
---

<sup>4</sup>By Denis GIROU.





And the resulting chart is:



## 5 3d pie charts assembled<sup>5</sup>

Here data and charts are simple. We just composed them in a more sophisticated way.

Main points to comment in this example are:

- Charts can also be considered as *graphical objects* and can be manipulated by other (L)T<sub>E</sub>X and PSTricks commands. Here we put the charts inside a `tabular` environment.

The common definitions for the three small pie charts are:

```
##\rput{15}{%  
  
ASPECT | solid | Salmon  
ASPECT | solid | Gold  
ASPECT | solid | DarkGreen  
  
first  
second  
third  
  
##}
```

**File TV/tv.dat**

and the three calls to **PstChart** are:

```
sed -e s/first/40/ -e s/second/38/ -e s/third/22/ tv.dat | \  
pstchart.sh pie 3d dim-x=5 dim-y=2 coef-height-pie-chart=0.5 \  
pie-chart-start-position=300 > nbc.pst
```

```
sed -e s/first/38/ -e s/second/23/ -e s/third/39/ tv.dat | \  
pstchart.sh pie 3d dim-x=5 dim-y=2 coef-height-pie-chart=0.5 \  
pie-chart-start-position=300 > cbs.pst
```

```
sed -e s/first/30/ -e s/second/27/ -e s/third/43/ tv.dat | \  
pstchart.sh pie 3d dim-x=5 dim-y=2 coef-height-pie-chart=0.5 \  
pie-chart-start-position=300 > abc.pst
```

---

<sup>5</sup>By Denis GIROU.

The composite picture is obtained by:

```

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% --* Mode: Latex --* %%%

%% tv.tex --- TV example for PstChart demos
%%
%% Author      : Denis GIROU (CNRS/IDRIS - France) <Denis.Girou@idris.fr>
%% Created the : Tue Mar 26 19:13:12 1996
%% Last mod. by : Denis GIROU (CNRS/IDRIS - France) <Denis.Girou@idris.fr>
%% Last mod. the : Tue Apr  7 20:25:33 1998
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

\documentclass[12pt]{article}

\usepackage{pstcol}   % To use the standard "color" package with PSTricks
\usepackage{pst-node}
\usepackage{pst-grad}
\usepackage{pst-addc} % My PSTricks extensions to draw wedges of ellipses

% Definitions of some colors used
\definecolor{DarkGreen}    {rgb}{0,0.5,0}
\definecolor{Gold}        {rgb}{1.,0.84,0.}
\definecolor{LemonChiffon}{rgb}{1.,0.98,0.8}
\definecolor{LightBlue}   {rgb}{0.68,0.85,0.9}
\definecolor{Salmon}      {cmyk}{0,0.53,0.38,0}

% Special commands
\newcommand{\Pie}[1]{%
\begin{pspicture}(-3,-1.5)(2.5,1.5)\input{#1.pst}\end{pspicture}}

\newcommand{\Wedge}[1]{%
\begin{pspicture}(-0.25,0.1)(0.25,0.6)
\pswedge[fillstyle=solid,fillcolor=#1]{0.5}{45}{135}
\end{pspicture}}

\newcommand{\Legend}{%
\raisebox{-2cm}[0cm][0cm]{%
\psframebox[linestyle=none,fillstyle=gradient,gradmidpoint=1,
gradbegin=LightBlue,gradend=yellow,gradangle=180]{%
\begin{tabular}{c}
\multicolumn{2}{l}{\large\textbf{Age (yrs)}} \\\[3mm]
\Wedge{Salmon}    & \textbf{< 18} \\\
\Wedge{Gold}     & \textbf{18-30} \\\
\Wedge{DarkGreen}& \textbf{> 30} \\\[6.2cm]
\end{tabular}}}}}}

\newcommand{\EntryName[1]{\raisebox{1.4cm}{\Large\textbf{\textcolor{white}{#1}}}}

\pagestyle{empty}

\begin{document}

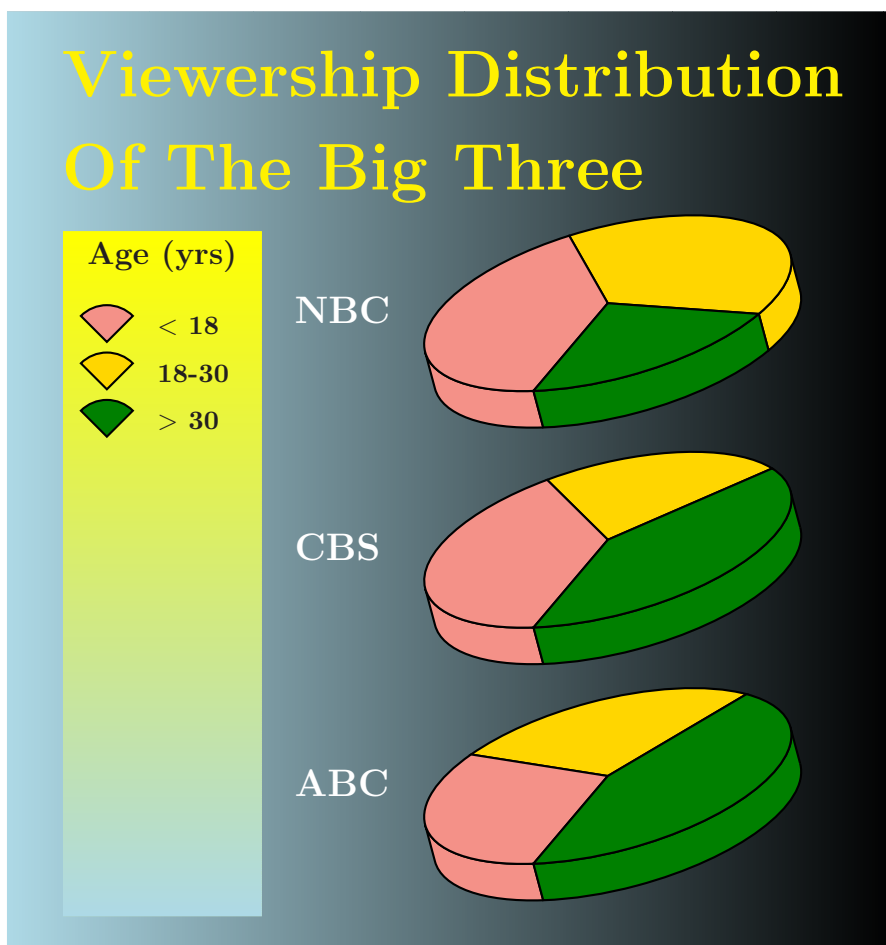
\psframebox[framesep=0.5,linestyle=none,fillstyle=gradient,gradmidpoint=1,
gradbegin=LightBlue,gradend=black,gradangle=90]{%
\begin{tabular}{llc}
\multicolumn{3}{l}{\multicolumn{3}{l}{\huge\textbf{\textcolor{yellow}{Viewership Distribution}}}} \\\[5mm]
\multicolumn{3}{l}{\multicolumn{3}{l}{\huge\textbf{\textcolor{yellow}{Of The Big Three}}}} \\\
\Legend & \EntryName{NBC} & \Pie{nbc} \\\
        & \EntryName{CBS} & \Pie{cbs} \\\
        & \EntryName{ABC} & \Pie{abc}
\end{tabular}}

\end{document}

```

File TV/tv.tex

And the resulting chart is:



## References

[PstChart] Denis GIROU, "PstChart User's Guide and Reference Manual", available on <http://www.tug.org/applications/PSTricks/PstChart>