Can I use pgfplots to make a boxplot

My current plotting tool for my papers is pgfplots for nice consistent plots. Now I would like to add a boxplot. Is this possible with help of pgfplots, or any helper package?

{pgfplots} {boxplot}

edited Sep 1 '11 at 17:17 — lockstep — 146k 35 441 609

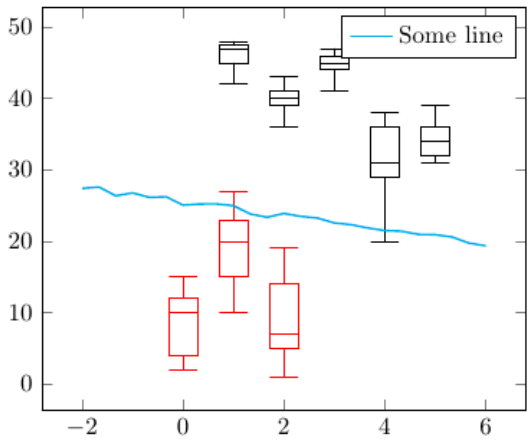
asked Oct 10 '10 at 20:20 — Peter Smit — 3,450 6 38 61

5 Answers

PGFPlots supports boxplots natively as of version 1.8 See Boxplot in latex for an example.

The remainder of this answer should be considered obsolete.

There is a much improved version of this code at Simpler boxplots in pgfplots - is this possible?. It allows creating box plots with a single command, and adds much more flexibility to the data format and the plot styles:



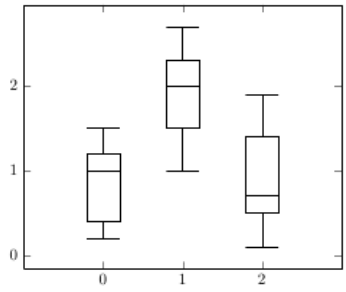
Original answer:

Not out of the box, and you'd have to do the quantile calculations outside of PGFplots, but then you can draw box plots with a bit of style trickery.

This code

```
\begin{axis} [enlarge x limits=0.5,xtick=data]
    \addplot [box plot median] table {testdata.dat};
    \addplot [box plot box] table {testdata.dat};
    \addplot [box plot top whisker] table {testdata.dat};
    \addplot [box plot bottom whisker] table {testdata.dat};
\end{axis}
```

can generate this plot



if `testdata.dat` is of the form

```
index median box_top box_bottom whisker_top whisker_bottom
```

Here's a full compilable example:

```
\documentclass{article}
\usepackage{pgfplots}
\usepackage{filecontents}

\begin{filecontents}{testdata.dat}
0 1 1.2 0.4 1.5 0.2
1 2 2.3 1.5 2.7 1
2 0.7 1.4 0.5 1.9 0.1
\end{filecontents}

\pgfplotsset{
    box plot/.style={
        /pgfplots/.cd,
        black,
        only marks,
        mark=-,
        mark size=1em,
        /pgfplots/error bars/.cd,
        y dir=plus,
        y explicit,
    },
    box plot box/.style={
        /pgfplots/error bars/draw error bar/.code 2 args={%
            \draw  ##1 -- ++(1em,0pt) |- ##2 -- ++(-1em,0pt) |- ##1 -- cycle;
        },
        /pgfplots/table/.cd,
        y index=2,
        y error expr={\thisrowno{3}-\thisrowno{2}},
        /pgfplots/box plot
    },
    box plot top whisker/.style={
        /pgfplots/error bars/draw error bar/.code 2 args={%
            \pgfkeysgetvalue{/pgfplots/error bars/error mark}%
            {\pgfplotserrorbarsmark}%
            \pgfkeysgetvalue{/pgfplots/error bars/error mark options}%
            {\pgfplotserrorbarsmarkopts}%
            \path ##1 -- ##2;
        },
        /pgfplots/table/.cd,
        y index=4,
        y error expr={\thisrowno{2}-\thisrowno{4}},
        /pgfplots/box plot
    },
    box plot bottom whisker/.style={
        /pgfplots/error bars/draw error bar/.code 2 args={%
            \pgfkeysgetvalue{/pgfplots/error bars/error mark}%
            {\pgfplotserrorbarsmark}%
            \pgfkeysgetvalue{/pgfplots/error bars/error mark options}%
            {\pgfplotserrorbarsmarkopts}%
            \path ##1 -- ##2;
        },
        /pgfplots/table/.cd,
```

```
        y index=5,
        y error expr={\thisrowno{3}-\thisrowno{5}},
        /pgfplots/box plot
    },
    box plot median/.style={
        /pgfplots/box plot
    }
}

\begin{document}
\begin{tikzpicture}
\begin{axis} [enlarge x limits=0.5,xtick=data]
    \addplot [box plot median] table {testdata.dat};
    \addplot [box plot box] table {testdata.dat};
    \addplot [box plot top whisker] table {testdata.dat};
    \addplot [box plot bottom whisker] table {testdata.dat};
\end{axis}
\end{tikzpicture}
\end{document}
```

edited May 21 '13 at 19:26

answered Jul 8 '11 at 13:13

Jake
156k 15 486 629

I'm having problems getting this to work with `symbolic x coords`. Is there something special I have to set? – knittl Jun 27 '12 at 16:41

@knittl: It works fine for me. Could you open a new question with an example where it doesn't work? – Jake Jun 27 '12 at 16:48

I've created a new question: tex.stackexchange.com/q/61446/15110 – knittl Jun 27 '12 at 16:57

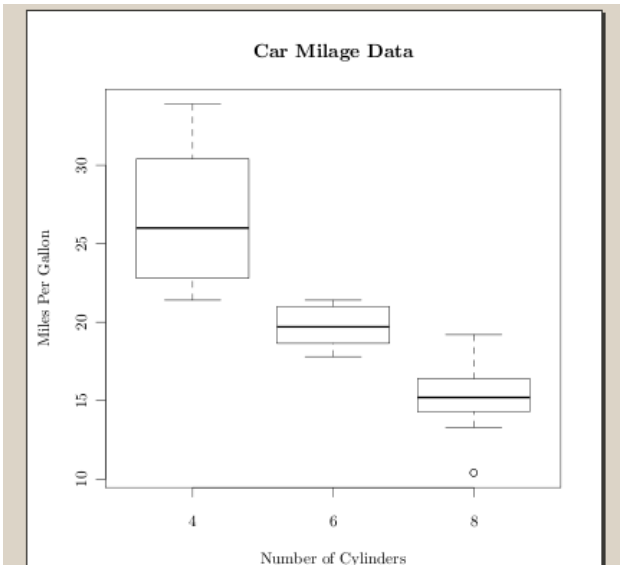
I'm trying to plot the real data values *behind* the boxes. I already tried `on background layer` (from backgrounds library) for the data points and `fill=white` for the boxes to no avail. Is there something about error bars, I'm missing (always drawn "in the back")? – knittl Jul 25 '12 at 17:44

@knittl: If you put the `\addplot` command for your data *before* the `box plot` commands, the lines should be plotted behind the boxplots. Markers will always be drawn on top, if you want to avoid that, you'll have to use a second `axis` environment that coincides with the first one. You might want to open a new question if this doesn't work. – Jake Jul 25 '12 at 18:28

If you use R, you can output the boxplot using tikzDevice.

Here's an example:

```
library(tikzDevice)
tikz('normal.tex', standAlone = TRUE, width=5, height=5)
boxplot(mpg~cyl,data=mtcars, main="Car Milage Data",
+    xlab="Number of Cylinders", ylab="Miles Per Gallon")
dev.off()
```



edited Jul 8 '11 at 13:48

answered Jul 8 '11 at 13:36

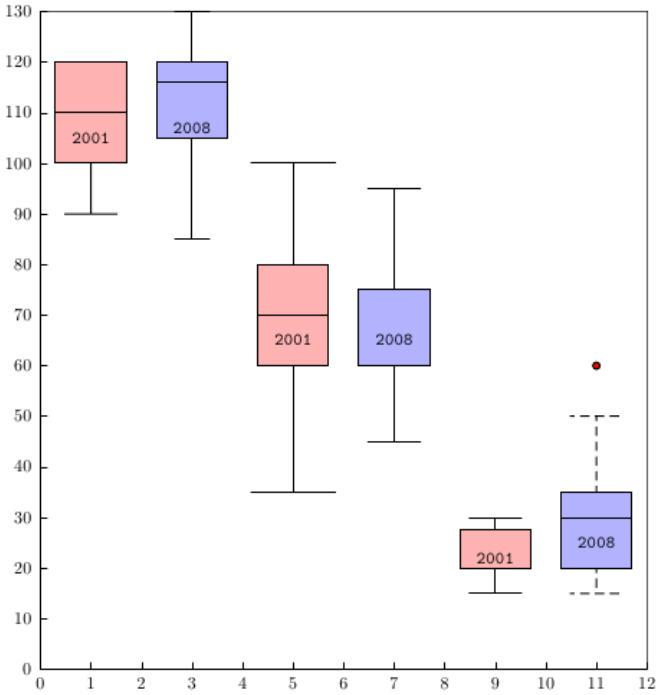
Frank_Zafka
511 9 21

For every point more than 3/2 times the interquartile range from the end of a box, is a dot. The only special optional arguments, beside all other which are valid for drawing lines and filling areas, are IQLfactor, barwidth, and arrowlength, where the latter is a factor which is multiplied with the barwidth for the line ends. The IQLfactor, preset to 1.5, defines the area for the outliers.

Run it with `xelatex`

```
\documentclass{article}
\usepackage{pst-plot}
\begin{document}

\begin{pspicture}(-1,-1)(12,14)
\psset{yunit=0.1,fillstyle=solid}
\psaxes[dy=1cm,Dy=10,ticksize=4pt 0,axesstyle=frame](0,0)(12,130)
\rput(1,0){\psBoxplot[fillcolor=red!30]{
   100 90 120 115 120 110 100 110 100 90 100 100 120 120 120}}\rput(1,105){2001}
\rput(3,0){\psBoxplot[arrowlength=0.5,fillcolor=blue!30]{
  90 120 115 116 115 110 90 130 120 120 120 85 100 130 130}}\rput(3,107){2008}
\rput(5,0){\psBoxplot[barwidth=40pt,arrowlength=1.2,fillcolor=red!30]{
  35 70 90 60 100 60 60 80 80 60 50 55 90 70 70}}\rput(5,65){2001}
\rput(7,0){\psBoxplot[barwidth=40pt,fillcolor=blue!30]{
  60 65 60 75 75 60 50 90 95 60 65 45 45 60 90}}\rput(7,65){2008}
\rput(9,0){\psBoxplot[fillcolor=red!30]{
  20 20 25 20 15 20 20 25 30 20 20 20 30 30 30}}\rput(9,22){2001}
\rput(11,0){\psBoxplot[fillcolor=blue!30,linestyle=dashed]{
  20 30 20 35 35 20 20 60 50 20 35 15 30 20 40}}\rput(11,25){2008}
\end{pspicture}
\end{document}
```



answered Jul 8 '11 at 13:36

Herbert
201k 13 282 566

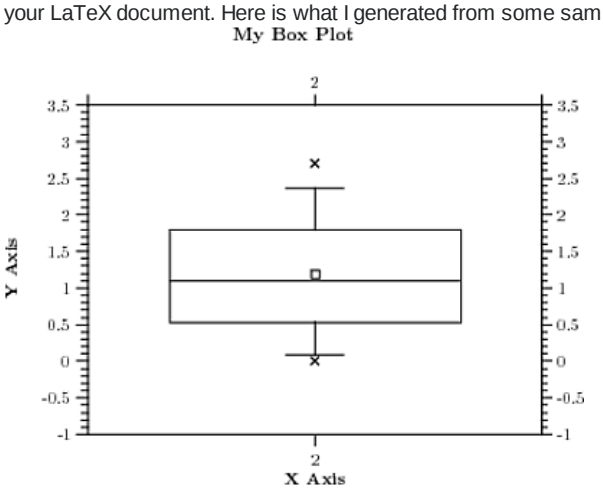
This is so cool! I want to re-purpose this for generating a performance plot. How would I display dates instead of numbers along the x axis as well as add a description of what the x and y axis are? Sorry, I am rather new to LaTeX. – The Dude May 8 '12 at 22:55

@TheDude: can you give an example (maybe a graphic) of what you really whant to show – Herbert May 23 '12 at 12:19

how to add x-axis and y-axis name? – KBM Dec 4 at 5:39

@KBM: use `\uput[-90](6,0){y.axis}` and `\uput[180](0,65){y}` or `\rput` or ... You can also rotate the names, if needed – Herbert Dec 4 at 7:51

QtiPlot is a free program that can take your spreadsheet data and create a box plot with a consistent look. You can change the title, x-axis, etc., and then export the image into a .tex file thereby generating all the code from \begin{tikzpicture} to \end{tikzpicture}. Copy that code into your LaTeX document. Here is what I generated from some sample data.



answered Jul 8 '11 at 18:09

DJP
4,341 1 11 22

I am not aware of any easy-to-use packages for producing box plots in `pgfplots` but this TeXample example and this topic at LaTeX Community show that it's not too hard to produce one.

answered Oct 10 '10 at 20:36

Pieter
3,788 1 17 35