

L^AT_EX and Friends

Graphs

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ucc

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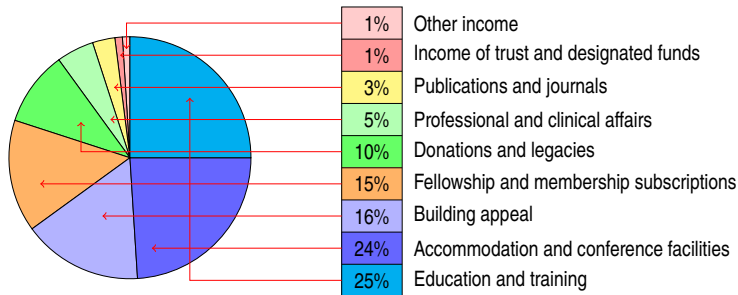
The Purpose of Data Plots

global trends Show data has “trend.”

differences Show differences between functions/trends.

rate of change Show rate of change within single function.

Kinds of Graphs: Pie Charts



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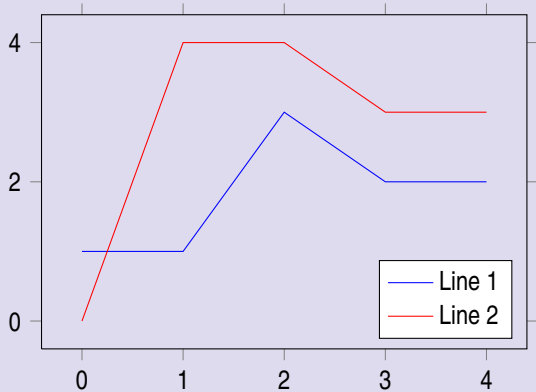
Acronyms & Abbreviations

About this Document

L^AT_EX Input

```
\begin{tikzpicture}
\begin{axis}[width=8cm,height=6cm,tick align=outside]
  \addplot[draw=blue]
    coordinates {(0,1) (1,1) (2,3) (3,2) (4,2)};
  \addlegendentry{Line 1}
  \addplot[draw=red]
    coordinates {(0,0) (1,4) (2,4) (3,3) (4,3)};
  \addlegendentry{Line 2}
\end{axis}
\end{tikzpicture}
```

L^AT_EX Output



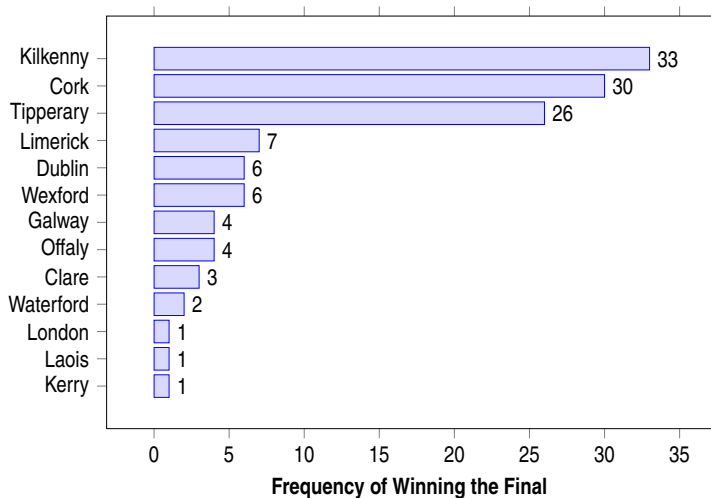
- `pgfplots` lets you draw graphs in various formats.
- The resulting graphs have a consistent, professional look and feel.
- The package also lets you import data from `matlab`.
- As is usual with the `pgf` family, their manuals are impressive [Feuersänger 2010].

The `\pgfplotsset` Command

L^AT_EX Input

```
\pgfplotsset{width=6cm,height=4cm,  
             compat=newest,  
             enlargelimits=0.18}
```

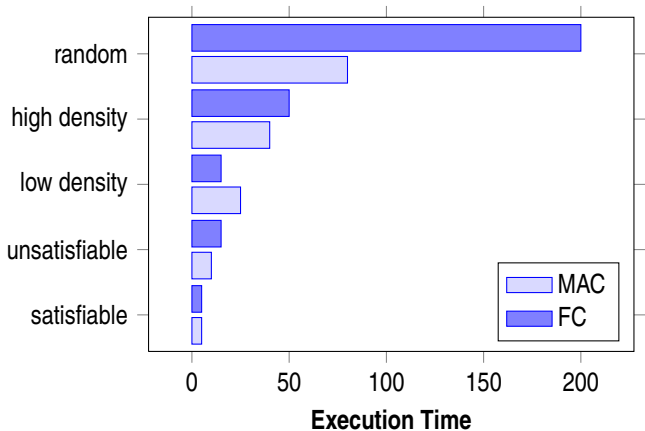
Bar Graphs



Creating Bar Graphs

L^AT_EX Input

```
\begin{axis}
  [xbar,width=11cm,height=8cm,bar width=10pt,enlargelimits=0.13,
  nodes near coords,
  nodes near coords align=horizontal,
  point meta=x * 1, % The displayed number.
  xlabel=\textbf{Frequency of Winning the Final},
  tick align=outside,
  xtick={0,5,...,35}, ytick={1,...,13},
  yticklabels={Kerry,Laois,London,Waterford,Clare,Offaly,Galway
               Wexford,Dublin,Limerick,Tipperary,Cork,Kilkenny}]
\addplot[draw=blue, fill=blue!15] coordinates
  {(1,1) (1,2) (1,3) (2,4) (3,5) (4,6) (4,7)
   (6,8) (6,9) (7,10) (26,11) (30,12) (33,13)};
\end{axis}
```



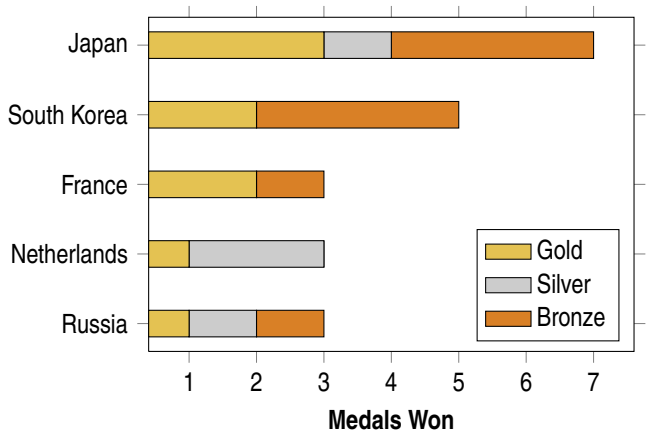
L^AT_EX Input

```

\begin{axis}
  [xbar,enlargelimits=0.14,width=8cm,height=6cm,,
  bar width=10pt,area legend,legend pos=south east,
  legend style={legend pos=north east,
                cells={anchor=west}},
  tick align=outside,xlabel=\textbf{Execution Time},
  ytick={1,...,5},
  yticklabels={satisfiable,unsatisfiable,
               low density,high density,random}]
\addplot[draw=blue,fill=blue!15]
  coordinates {(5,1) (10,2) (25,3) (40,4) (80,5)};
\addlegendentry{\textsc{MAC}}
\addplot[draw=blue,fill=blue!50]
  coordinates {(5,1) (15,2) (15,3) (50,4) (200,5)};
\addlegendentry{\textsc{FC}}
\end{axis}

```

Component Bar Graphs



L^AT_EX Input

```

\begin{axis}
  [xbar stacked, stack plots=x, tick align=outside,
   width=8cm, height=6cm, bar width=10pt,
   legend style={cells={anchor=west}}, area legend,
   xlabel=\textbf{Medals Won}, ytick={1,...,5},
   yticklabels={Russia,Netherlands,France,
                South Korea,Japan}]
\addplot[draw=black,yellow!50!brown]
  coordinates {(1,1) (1,2) (2,3) (2,4) (3,5)};
\addlegendentry{Gold}
\addplot[draw=black,white!60!gray]
  coordinates {(1,1) (2,2) (0,3) (0,4) (1,5)};
\addlegendentry{Silver}
\addplot[draw=black,orange!70!gray]
  coordinates {(1,1) (0,2) (1,3) (3,4) (3,5)};
\addlegendentry{Bronze}
\end{axis}

```

Coordinate Systems

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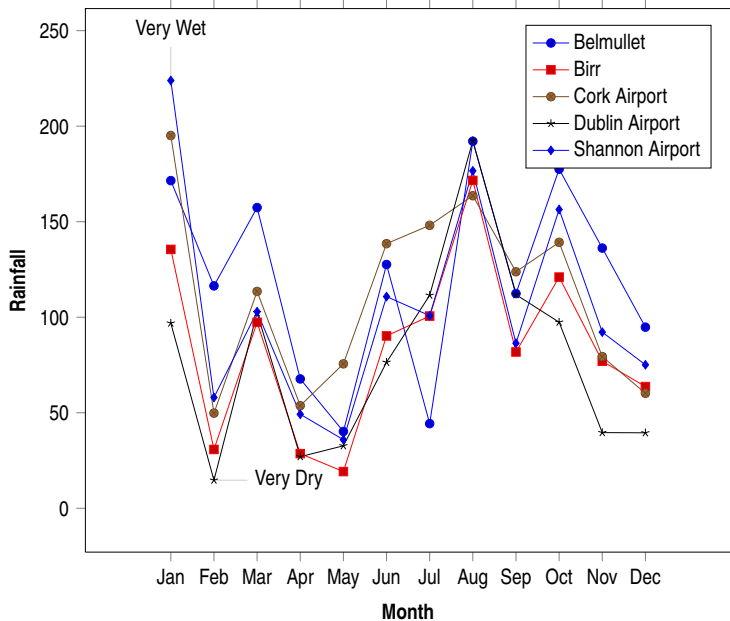
`axis cs` Coordinates same as plot coordinates.

`rel axis cs` Unit square scaled to plot coordinates.

`xticklabel cs` Projection of relative coordinates on to x-axis.

`yticklabel cs` Projection of relative coordinates on to y-axis.

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```
\begin{axis}
  [width=\textwidth,enlargelimits=0.18,tick align=outside,
  legend style={cells={anchor=west},legend pos=north east},
  xticklabels={Jan,Feb,Mar,Apr,May,Jun,Jul,Aug,Sep,Oct,Nov,Dec},
  xtick={1,2,3,4,5,6,7,8,9,10,11,12},
  xlabel=\textbf{Month}, ylabel=\textbf{Rainfall}]
\end{axis}

\node[coordinate,pin=above:{Very Wet}] at (axis cs:1,223.9) {};
\node[coordinate,pin=right:{Very Dry}] at (axis cs:2,14.7) {};

\addplot+[sharp plot] coordinates
  {(1,171.5) (2,116.4) (3,157.4) (4,67.7) (5,40.2) (6,127.6)
  (7,44.3) (8,192.1) (9,112.4) (10,177.5) (11,136.2) (12,94.8)};

\addlegendentry{Belmullet}

\addplot+[sharp plot] coordinates
  {(1,135.5) (2,30.8) (3,97.3) (4,28.6) (5,19.2) (6,90.2)
  (7,100.6) (8,171.6) (9,81.8) (10,121.0) (11,77.0) (12,63.7)};

\addlegendentry{Birr}

\addplot+[sharp plot] coordinates
  {(1,195.1) (2,49.8) (3,113.5) (4,53.7) (5,75.6) (6,138.5)
  (7,148.1) (8,163.6) (9,123.8) (10,139.2) (11,79.4) (12,60.2)};

\addlegendentry{Cork Airport}

\addplot+[sharp plot] coordinates
  {(1,96.9) (2,14.7) (3,102.4) (4,27.0) (5,32.7) (6,76.4)
  (7,111.5) (8,192.4) (9,111.8) (10,97.4) (11,39.6) (12,39.5)};

\addlegendentry{Dublin Airport}

\addplot+[sharp plot] coordinates
  {(1,223.9) (2,58.0) (3,102.9) (4,49.2) (5,35.9) (6,110.8)
  (7,100.8) (8,176.6) (9,86.4) (10,156.4) (11,92.2) (12,75.1)};
```


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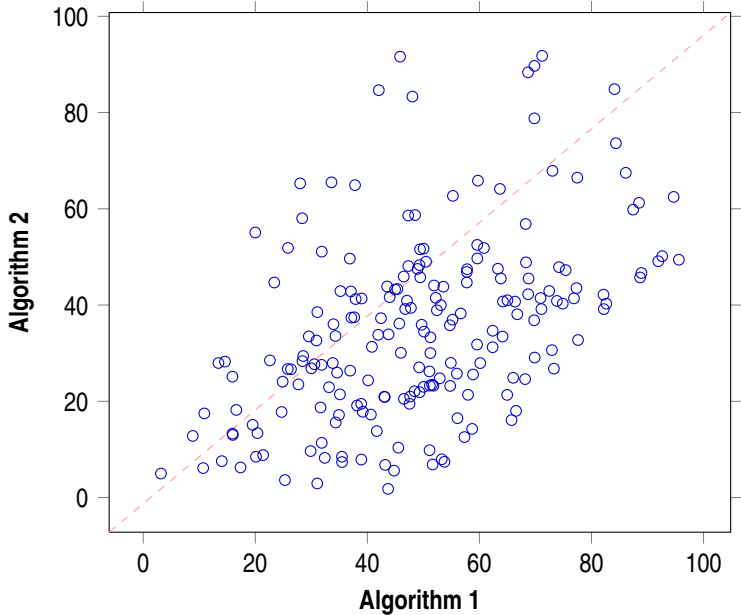
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```
\begin{axis}  
  [width=\textwidth, tick align=outside,  
   xlabel=\textbf{Algorithm~1},  
   ylabel=\textbf{Algorithm~2}]  
\addplot{scatter,only marks,mark=o,  
  draw=blue,scatter src=explicit}  
  file {data.dat};  
\draw[dashed,red!40]  
  (rel axis cs:0,0) -- (rel axis cs:1,1);  
\end{axis}
```

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```
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55.26331078124413 62.693338544226066
43.70125549717245 1.8025725612135672
53.27409074259773 7.944849302471692
82.63910390525706 40.29215474931301
65.73269537881723 16.095506642381075
69.86468729668312 29.08789038430851
```

...

Feuersänger, Christian [5th Aug. 2010]. *Manual for Package PGFPLOTS*.
Version 1.4.1.

Acronyms and Abbreviations

AMS American Mathematical Society

API Application Programming Interface

APL A Programming Language

CTAN Comprehensive T_EX Archive Network

CD Compact Disk

FAQ Frequently Asked Question

GUI Graphical User Interface

IDE Integrated Development Environment

ISBN International Standard Book Number

SI Système International d'Unités/International System of Units

OS Operating System

TUG T_EX Users Group

URL Uniform Resource Locator

WYSIWYG What You See is What You Get

About this Document

- This document was created with `pdflatex`.
- The L^AT_EX document class is `beamer`.
- The main font is *T_EX Gyre Heros Condensed*.
 - You may obtain the font from <http://www.gust.org.pl>.