

The `l3charts` package

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<https://git.itsufficient.me/latex/l3charts>

Abstract

This package defines a few simple `TikZ` charts that can be drawn using `LATEX` environments. This has mainly been developed as an experimentation of `expl3` for checking what `LATEX3` really brought to facilitate package development (expansion control, `clist`, `seq`, `prop`, ...).

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1 About this documentation

I doubt that \LaTeX will have one day a modern documentation system as powerful as **cargo doc** due to its typeless and syntaxless nature. In my opinion \LaTeX literate programming with **docstrip** is just an ugly hack that turns the code and the documentation unmaintainable, and it's probably the component of \LaTeX which aged the most.

So I chose to write the documentation separately and borrowed much of the style from the **microtype** package which by the way, pushed the **docstrip** mastery to a *black magic* level.

2 Kiviat chart

2.1 Usage

The **kiviat chart** or *radar chart* allows to represent one or several set along several dimensions.

`\begin{kiviatchart}` Environment that hold a kiviat chart. Accepts an optional argument [*<clist>*] which is comma separated list of keywords and values :

radius *<dim>* 3.5cm

Maximal diagram radius

label-radius *<dim>* 3.5cm

Radius to put dimension labels on

units *<int>* 5

Set the scale of units from 0 to the given number

***** *<keyval>*

All other options are passed to **tikzpicture** (*env*)

A **kiviatchart** (*env*) should begin with a **dims** (*env*), followed by one or several **set** (*env*).

2.1.1 Dimensions

`\begin{dims}` Environment that hold the definition of all dimensions. Accepts an optional argument [*<clist>*] which is comma separated list of keywords and values :

dim-options *<prop>* {opacity=0.8}

TikZ options for drawing dimensions axis with

unit-options *<prop>* {opacity=0.3}

TikZ options for drawing unit polygons with

label-options *<prop>* {opacity=0.5,below}

TikZ options drawing for unit labels

label-cs *<str>* identity

Name of the cs used to format labels

unit-cs *<str>* tinytt

Name of the cs used to format unit scale

`\tinytt` Macro used to format unit labels

`\cs_new:Npn \tinytt #1 {\texttt{\tiny #1}}`

`\value` `\value[<clist>]{<label>}` is used to add a dimension to the kiviat chart. [*<clist>*] is passed to TikZ to draw the nodes corresponding to the labels.

2.1.2 Set

`\begin{set}` **set** (*env*) is used to add a new set to the kiviat chart. Accepts an optional argument [*<clist>*] which is comma separated list of keywords and values :

`\end{set}`

- dot-options** `<prop>` `{fill,circle,inner sep=1pt}`
Options for polygon node
- *** `<keyval>` `color=black,line width=1.5pt,opacity=1,fill opacity=0.3,fill=gray`
All other options are passed to `\draw cs` which draws the polygon
- \value** `\value{<int>}` is used to add a value to the set.
There must be the same number of `\value` inside `set (env)` and `dims (env)`, and each `\value` corresponds to the dimension in `dims (env)` at the same index.

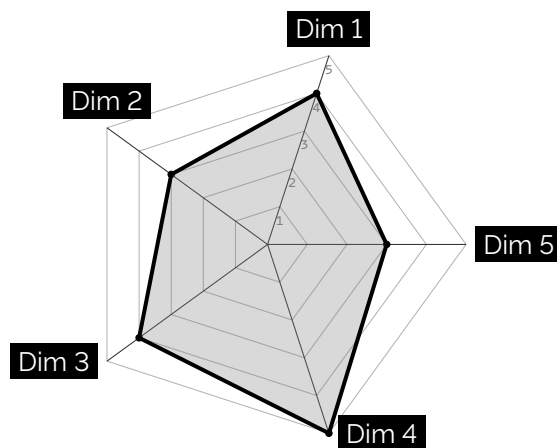
2.2 Examples

2.2.1 Simple

Use **label-cs** to call `\textinv` to format the labels.

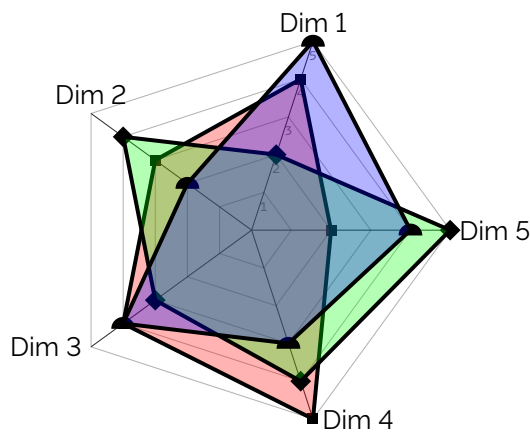
\textinv Macro used to format labels

```
% white text on black background
\NewDocumentCommand\textinv{m}{%
  \colorbox{black}{\textcolor{white}{#1}}}
```



```
% scale is passed to tikzpicture
\begin{kiviatchart}[scale=0.75]
% Define all the dimensions
\begin{dims}[label-cs=textinv]
% Specify placement of each
% labels
\value[above]{Dim 1}
\value[above]{Dim 2}
\value[left]{Dim 3}
\value[right]{Dim 4}
\value[right]{Dim 5}
\end{dims}
% Add one or several sets.
% Each value corresponds to
% the dimension at the same
% index in dims
\begin{set}
\value{4}
\value{3}
\value{4}
\value{5}
\value{3}
\end{set}
\end{kiviatchart}
```

2.2.2 Multi-set



```
% scale is passed to tikzpicture
\begin{kiviatchart}[scale=0.75]
\begin{dims}
  \value[above]{Dim 1}
  \value[above]{Dim 2}
  \value[left]{Dim 3}
  \value[right]{Dim 4}
  \value[right]{Dim 5}
\end{dims}
% Fill this set in red
% with rectangle dots
\begin{set}[
  fill=red,
  dot-options={
    fill,rectangle,
    inner sep=2pt
  }
]
  \value{4}
  \value{3}
  \value{4}
  \value{5}
  \value{2}
\end{set}
% Fill this set in green
% with diamond dots
\begin{set}[
  fill=green,
  dot-options={
    fill,diamond,
    inner sep=2pt
  }
]
  \value{2}
  \value{4}
  \value{3}
  \value{4}
  \value{5}
\end{set}
% Fill this set in blue
% with semicircle dots
\begin{set}[
  fill=blue,
  dot-options={
    fill,semicircle,
    inner sep=2pt
  }
]
  \value{5}
  \value{2}
  \value{4}
  \value{3}
  \value{4}
\end{set}
\end{kiviatchart}
```

2.3 To do

At the moment the environments are not user friendly. We could provide basic sanity checks, with error messages when theses rules are violated :

- one and only one `dims` (*env*) declared before any `set` (*env*)
- all `set` (*env*) have the same number of `\value` than the `dims` (*env*)
- `\value` in `set` (*env*) is between 0 and `units`

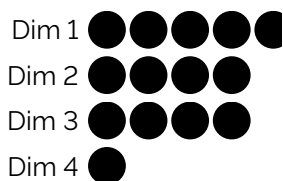
3 Ball chart

3.1 Usage

| | | | |
|--------------------------------|--|---|-----------------|
| <code>\begin{ballchart}</code> | Environment that hold a ball chart. Accepts an optional argument [<i><clist></i>] which is comma separated list of keywords and values : | | |
| <code>\end{ballchart}</code> | | | |
| n | <i><int></i> | The number of circles (required) | |
| v-sep | <i><fp></i> | Vertical separator in <i>cm</i> | 0.1 |
| h-sep | <i><fp></i> | Horizontal separator (circle) in <i>cm</i> | 0.5 |
| radius | <i><fp></i> | Radius of the circles in <i>cm</i> | 0.25 |
| gap | <i><fp></i> | Gap between circle in <i>cm</i> | 0.05 |
| label-cs | <i><str></i> | Macro name to format labels | identity |
| fill-options | <i><prop></i> | TikZ options to fill balls with | {fill=black} |
| draw-options | <i><prop></i> | TikZ options to draw balls with | {draw=black!30} |
| label-options | <i><prop></i> | TikZ options for dimensions axis | {left} |
| * | <i><keyval></i> | All other options are passed to <code>tikzpicture</code> (<i>env</i>) | |
| \value | <code>\value{<label>}{<percent>}</code> is used to add a new bar. | | |

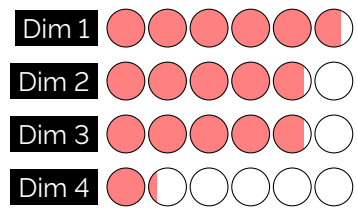
3.2 Examples

3.2.1 Simple



```
% 5 circles bar, hide the circles
\begin{ballchart}[
  n=5,
  draw-options={draw=none}]
\value{Dim 1}{95}
\value{Dim 2}{80}
\value{Dim 3}{80}
\value{Dim 4}{20}
\end{ballchart}
```

3.2.2 Delimited



```
% 6 circles bar, format the labels,
% fill in red, and shows circles
\begin{ballchart}[
  n=6,
  label-cs=textinv,
  v-sep=0.2,
  fill-options={fill=red!50},
  draw-options={draw=black}]
\value{Dim 1}{95}
\value{Dim 2}{80}
\value{Dim 3}{80}
\value{Dim 4}{20}
\end{ballchart}
```

4 Bar chart

4.1 Usage

| | | | |
|-------------------------------|---|---|-----------------|
| <code>\begin{barchart}</code> | Environment that hold a bar chart. Accepts an optional argument [<i><clist></i>] which is comma separated list of keywords and values : | | |
| <code>\end{barchart}</code> | | | |
| <code>width</code> | <i><fp></i> | Maximum width (required) in <i>cm</i> | |
| <code>height</code> | <i><fp></i> | Bar height in <i>cm</i> | 0.35 |
| <code>gap</code> | <i><fp></i> | Gap in <i>cm</i> | 0.25 |
| <code>fill-options</code> | <i><prop></i> | TikZ options to fill the bar with | {fill=black} |
| <code>draw-options</code> | <i><prop></i> | TikZ options to draw the bar with | {draw=black!20} |
| <code>label-cs</code> | <i><prop></i> | Macro name to format labels | identity |
| <code>*</code> | <i><keyval></i> | All other options are passed to <code>tikzpicture</code> (<i>env</i>) | |
| <code>\value</code> | <code>\value{<label>}{<percent>}</code> is used to add a new bar. | | |

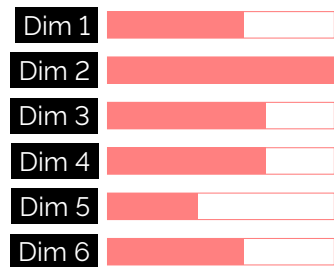
4.2 Examples

4.2.1 Simple



```
% hide borders
\begin{barchart}[
  width=3,
  draw-options={draw=none}]
\value{Dim 1}{60}
\value{Dim 2}{100}
\value{Dim 3}{70}
\value{Dim 4}{70}
\value{Dim 5}{40}
\value{Dim 6}{60}
\end{barchart}
```

4.2.2 Delimited



```
% 3cm wide bars, format labels,
% fill in red and show borders
\begin{barchart}[
  width=3,
  label-cs=textinv,
  fill-options={fill=red!50},
  draw-options={draw=red!50}]
\value{Dim 1}{60}
\value{Dim 2}{100}
\value{Dim 3}{70}
\value{Dim 4}{70}
\value{Dim 5}{40}
\value{Dim 6}{60}
\end{barchart}
```

5 Bubble chart

5.1 Usage

| | | | |
|----------------------------------|--|---|-----------------|
| <code>\begin{bubblechart}</code> | Environment that hold a bubble chart. Accepts an optional argument [<i><clist></i>] which is comma separated list of keywords and values : | | |
| <code>\end{bubblechart}</code> | | | |
| <code>radius</code> | <i><fp></i> | | 1 |
| Max radius in <i>cm</i> | | | |
| <code>gap</code> | <i><fp></i> | | 0.3 |
| Gap between bubbles in <i>cm</i> | | | |
| <code>fill-options</code> | <i><prop></i> | | {fill=black} |
| TikZ options to fill bubble with | | | |
| <code>draw-options</code> | <i><prop></i> | | {draw=black!30} |
| TikZ options to draw bubble with | | | |
| <code>label-cs</code> | <i><str></i> | | identity |
| Macro name to format labels | | | |
| <code>*</code> | <i><keyval></i> | All other options are passed to <code>tikzpicture</code> (<i>env</i>) | |
| <code>\value</code> | <code>\value{<label>}{<percent>}</code> is used to add a new bubble. | | |

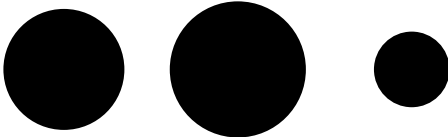
5.2 Examples

5.2.1 Simple

Dim 1

Dim 2

Dim 3



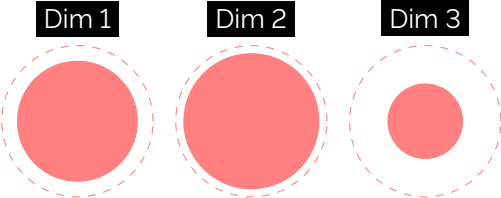
```
% hide borders
\begin{bubblechart}[
  draw-options={draw=none}]
  \value{Dim 1}{80}
  \value{Dim 2}{90}
  \value{Dim 3}{50}
\end{bubblechart}
```

5.2.2 Delimited

Dim 1

Dim 2

Dim 3



```
% Format labels, fill in red,
% and show maximum dashed
\begin{bubblechart}[
  label-cs=textinv,
  fill-options={fill=red!50},
  draw-options={draw=red!50,dashed}]
  \value{Dim 1}{80}
  \value{Dim 2}{90}
  \value{Dim 3}{50}
\end{bubblechart}
```

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| | fill-options | 5–7 | unit-options | 2 |
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7 Changes

0.2.0 (2022/07/04)

- define a document class borrowed from `microtype`

0.1.0 (2022/07/01)

- Initial version