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, ...).

Contents

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, pushes 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}` `\end{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}` `\end{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}` `\end{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 :

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.

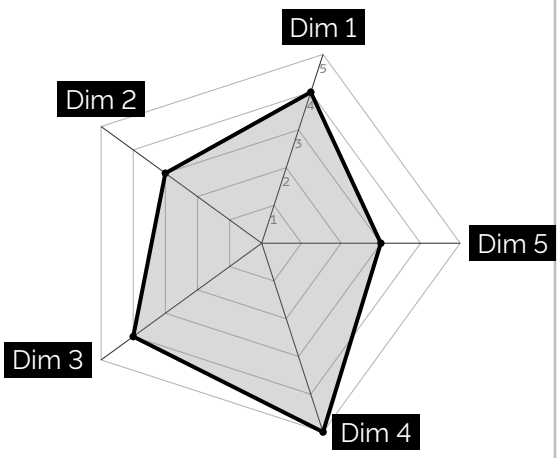
2.2 Examples

2.2.1 Simple

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

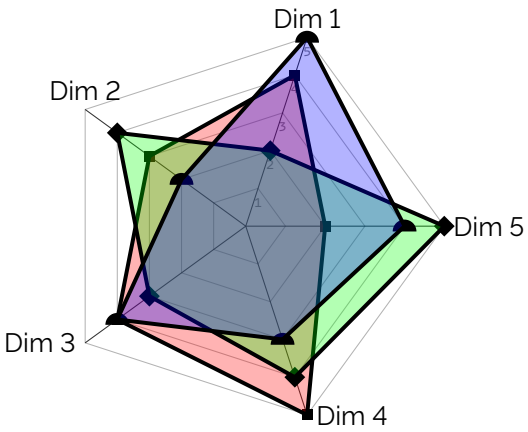
\textinv Macro used to format labels

```
%  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

`\begin{ballchart}` `\end{ballchart}` Environment that hold a ball chart. Accepts an optional argument `[`⟨*clist*⟩`]` which is comma separated list of keywords and values :

`n` ⟨*int*⟩ `5`
The number of circles

`v-sep` ⟨*fp*⟩ `0.1`
Vertical separator in *cm*

`h-sep` ⟨*fp*⟩ `0.5`
Horizontal separator (circle) in *cm*

`radius` ⟨*fp*⟩ `0.25`
Radius of the circles in *cm*

`gap` ⟨*fp*⟩ `0.05`
Gap between circle in *cm*

`label-cs` ⟨*str*⟩ `identity`
Macro name to format labels

`fill-options` ⟨*prop*⟩ `{fill=black}`
Ti*k*Z options to fill balls with

`draw-options` ⟨*prop*⟩ `{draw=black!30}`
Ti*k*Z options to draw balls with

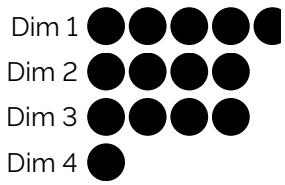
`label-options` ⟨*prop*⟩ `{left}`
Ti*k*Z options for dimensions axis

`*` ⟨*keyval*⟩
All other options are passed to `tikzpicture` (*env*)

`\value` `\value{`⟨*label*⟩`}{`⟨*percent*⟩`}` is used to add a new bar.

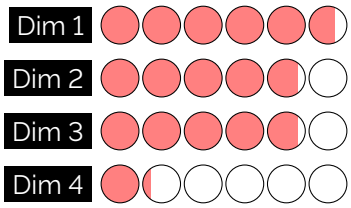
3.2 Examples

3.2.1 Simple




```
% 5 circles bar, hide the circles
\begin{ballchart}[
    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

`\begin{barchart}` `\end{barchart}` Environment that hold a bar chart. Accepts an optional argument `[`⟨*clist*⟩`]` which is comma separated list of keywords and values :

`width` ⟨*fp*⟩ `3`
Maximum width in *cm*

`height` ⟨*fp*⟩ `0.35`
Bar height in *cm*

`gap` ⟨*fp*⟩ `0.25`
Gap in *cm*

`fill-options` ⟨*prop*⟩ `{fill=black}`
TikZ options to fill the bar with

`draw-options` ⟨*prop*⟩ `{draw=black!20}`
TikZ options to draw the bar with

`label-cs` ⟨*prop*⟩ `identity`
Macro name to format labels

`*` ⟨*keyval*⟩
All other options are passed to `tikzpicture` (*env*)

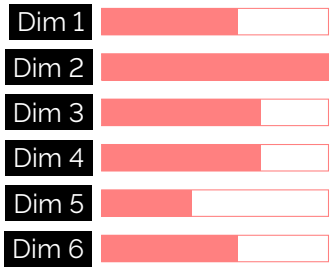
`\value` `\value{`⟨*label*⟩`}{`⟨*percent*⟩`}` is used to add a new bar.

4.2 Examples

4.2.1 Simple


```
% hide borders
\begin{barchart}[
    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

`\begin{bubblechart}` `\end{bubblechart}` Environment that hold a bubble chart. Accepts an optional argument `[`⟨*clist*⟩`]` which is comma separated list of keywords and values :

`radius` ⟨*fp*⟩ `1`
Max radius in *cm*

`gap` ⟨*fp*⟩ `0.3`
Gap between bubbles in *cm*

`fill-options` ⟨*prop*⟩ `{fill=none,draw=black!30}`
TikZ options to fill/draw the background with

`draw-options` ⟨*prop*⟩ `{fill=black,draw=none}`
TikZ options to fill/draw the bubble with

`label-cs` ⟨*str*⟩ `identity`
Macro name to format labels

`label-pos` ⟨*str*⟩ `above`
Position of the label

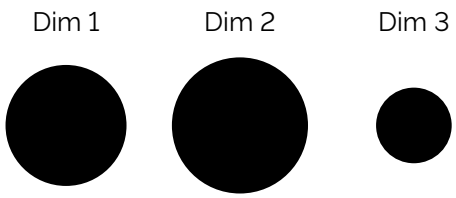
`vertical` ⟨*bool*⟩ `false`
Stack the bubble vertically instead of horizontally

`*` ⟨*keyval*⟩
All other options are passed to `tikzpicture` (*env*)

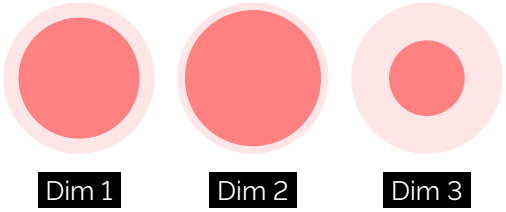
`\value` `\value{`⟨*label*⟩`}{`⟨*percent*⟩`}` is used to add a new bubble.

5.2 Examples

5.2.1 Horizontal

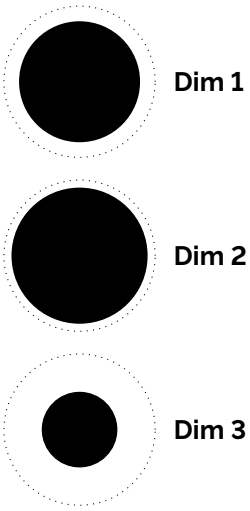



```
% hide borders
\begin{bubblechart}[
    fill-options={draw=none}]
  \value{Dim 1}{80}
  \value{Dim 2}{90}
  \value{Dim 3}{50}
\end{bubblechart}
```




```
% Format labels, position below
% fill in red, and
% show maximum disk
\begin{bubblechart}[
    label-cs=textinv,
    label-pos=below,
    draw-options={
        draw=none,
        fill=red!50},
    fill-options={
        fill=red!10,
        draw=none}]
  \value{Dim 1}{80}
  \value{Dim 2}{90}
  \value{Dim 3}{50}
\end{bubblechart}
```

5.2.2 Vertical




```
% Stack bubbles vertically
% show max as a dotted line
% and put labels in bold on the right
\begin{bubblechart}[
    vertical=true,
    label-cs=textbf,
    label-pos=right,
    fill-options={
        draw=black,
        dotted}]
  \value{Dim 1}{80}
  \value{Dim 2}{90}
  \value{Dim 3}{50}
\end{bubblechart}
```

6 Radial chart

6.1 Usage

`\begin{radialchart}` `\end{radialchart}` Environment that hold a radial chart. Accepts an optional argument `[`⟨*clist*⟩`]` which is comma separated list of keywords and values :

`radius` ⟨*fp*⟩ `1`

Max radius in cm

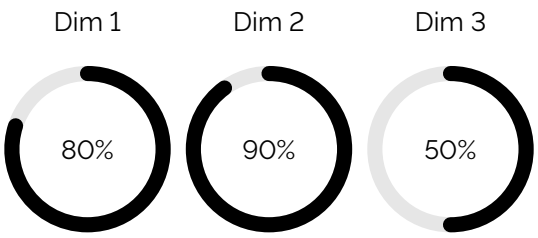
`gap` ⟨*fp*⟩ `0.4`

Gap between radials in cm

`label-cs`	⟨*str*⟩	`identity`
	cs name to format labels with	
`label-pos`	⟨*str*⟩	`above`
	Label position relative to radial	
`value-cs`	⟨*str*⟩	`identity`
	cs name to format values with	
`vertical`	⟨*bool*⟩	`false`
	Stack radials vertically instead of horizontally	
`draw-options`	⟨*prop*⟩	`black`
	TikZ options to draw the radial with	
`fill-options`	⟨*prop*⟩	`{fill=none,draw=black!10}`
	TikZ options to fill/draw the center of the radial with	
`*`	⟨*keyval*⟩	`line width=2mm,line cap=round`
	All other options are passed to `tikzpicture` (*env*)	

6.2 Examples

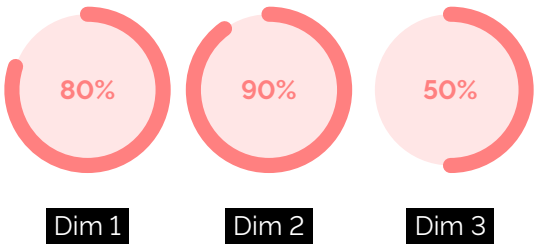
6.2.1 Horizontal




```
\begin{radialchart}
  \value{Dim 1}{80}
  \value{Dim 2}{90}
  \value{Dim 3}{50}
\end{radialchart}
```

`\redbold` Macro used to format values

```
%  bold text in red
\NewDocumentCommand\redbold{m}{\textcolor{red!50}{\textbf{#1}}}
```




```
% Format labels and values,
% position labels below,
% hide ring and show disc
\begin{radialchart}[
    label-cs=textinv,
    label-pos=below,
    value-cs=redbold,
    draw-options={red!50},
    fill-options={
        draw=none,
        fill=red!10}]
  \value{Dim 1}{80}
  \value{Dim 2}{90}
  \value{Dim 3}{50}
\end{radialchart}
```

6.2.2 Vertical


```
% Stack radials vertically
% and put labels on the right
\begin{radialchart}[
    vertical=true,
    value-cs=textbf,
    label-pos=right,
    fill-options={
        draw=black!10,
        fill=black!10}]
  \value{Dim 1}{80}
  \value{Dim 2}{90}
  \value{Dim 3}{50}
\end{radialchart}
```

7 Index

Numbers in upright shape refer to the *page* where the corresponding entry is described (bold face) resp. occurs.

8 Changes

0.3.0 (2022/07/15)

- add a `radialchart` (*env*) to draw radials
- add a vertical mode to `bubblechart` (*env*) and allow positioning of the label
- swap `fill-options` and `draw-options` for `bubblechart` (*env*) for consistency

0.2.0 (2022/07/04)

- define a document class borrowed from `microtype`

0.1.0 (2022/07/01)

- Initial version