The `l3charts` package

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https://github.com/eburghar/l3charts

Abstract

This package defines a few simple TikZ charts that can be drawn using LaTeX environments. This has mainly been developped as an experimentation of `expl3` for checking what LaTeX3 really brought to facilitate package developpement (expansion control, clist, seq, prop, ...).

Contents

1 About this documentation

I doubt that LaTeX will have one day a 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}`
`\end{kiviatchart}`

Environment that hold a kiviat chart. Accepts an optional argument `[`⟨*clist*⟩`]` which is comma separated list of the following options :

`radius` ⟨*dim*⟩ `3.5cm`

Maximal diagram radius

`label-radius` ⟨*dim*⟩ `3.5cm`

Radius to put dimention 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 keyword 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 containing 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 keyword 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

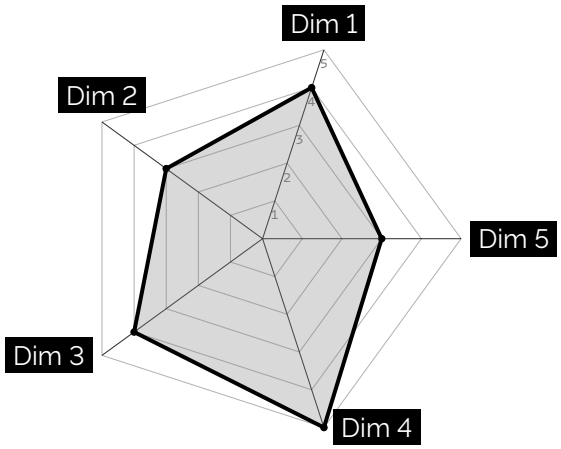
2.2.1 Simple

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

`\textinv` Macro used to format labels

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

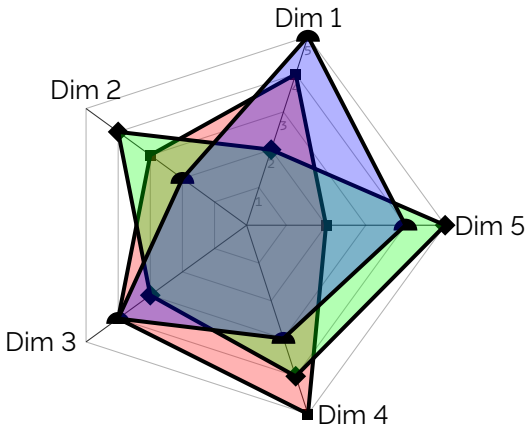
```
% the scale option is passed to tikzpicture
\begin{kiviatchart}[scale=0.75]
  % we define all the dimentions of the charts, and specify the placement
  % of labels relatively to the nodes
  \begin{dims}[label-cs=textinv]
    \value[above]{Dim 1}
    \value[above]{Dim 2}
    \value[left]{Dim 3}
    \value[right]{Dim 4}
    \value[right]{Dim 5}
  \end{dims}
  % Then we can add one or several sets. Each value correspond to
  % the dimension at the same index in dims environment
  \begin{set}
    \value{4}
    \value{3}
    \value{4}
    \value{5}
    \value{3}
  \end{set}
\end{kiviatchart}
```



2.2.2 Multi-set

Each set set its own color and point shape.

```
% the scale option 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*)
- `set` (*env*) has the same number of `\value` than `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 keyword and values :

`n` ⟨*int*⟩
The number of circles (**required**)

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

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

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

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

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

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

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

`label-options` ⟨*prop*⟩ `{left}`
TikZ options for dimensions axis

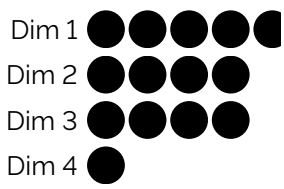
`*` ⟨*keyval*⟩
All other options are passed to `tikzpicture` (*env*)

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

3.2 Examples

3.2.1 Simple

```
% draw 5 circles bar hidding 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}
```

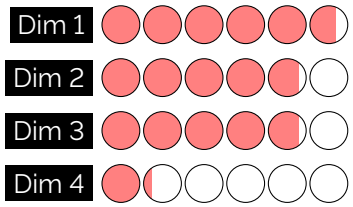


3.2.2 Delimited

Format labels, show circles, change color, add more circles.

```
% 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 the following options :

`width` ⟨*fp*⟩
maximum width (**required**) in cm

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

`gap` ⟨*fp*⟩ `0.25`
Gap in cm

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

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

`label-cs` ⟨*prop*⟩ `identity`
cs 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

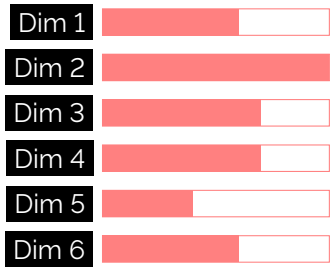
4.2.1 Simple

```
% 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

Change color, show as a gauge.

```
% draw 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 the following options :

radius ⟨*fp*⟩ — default: `1`

Max radius in cm

gap ⟨*fp*⟩ — default: `0.3`

Gap between bubbles in cm

fill-options ⟨*prop*⟩ — default: `{fill=black}`

TikZ options to fill bubble with

draw-options ⟨*prop*⟩ — default: `{draw=black!30}`

TikZ options to draw bubble with

label-cs ⟨*str*⟩ — default: `identity`

cs name to format labels

***** ⟨*keyval*⟩

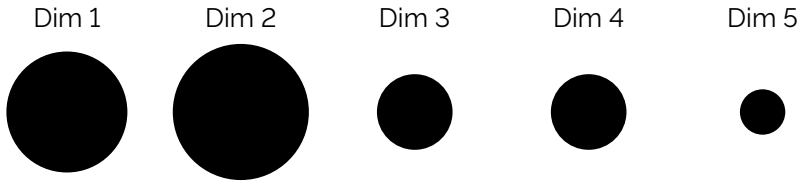
All other options are passed to `tikzpicture` (*env*)

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

5.2 Examples

5.2.1 Simple

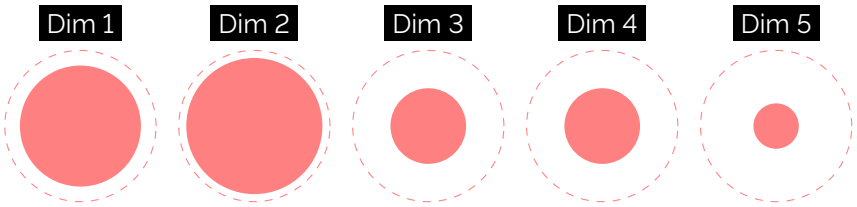
```
% hide borders
\begin{bubblechart}[draw-options={draw=none}]
  \value{Dim 1}{80}
  \value{Dim 2}{90}
  \value{Dim 3}{50}
  \value{Dim 4}{50}
  \value{Dim 5}{30}
\end{bubblechart}
```



5.2.2 Delimited

Format labels, change colors, show absolute limit (100%)

```
% formate 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}
  \value{Dim 4}{50}
  \value{Dim 5}{30}
\end{bubblechart}
```



6 Index

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

7 Changes

0.2.0 (2022/07/04)

- define a document class borrowed to `microtype`

0.1.0 (2022/07/01)

- Initial version