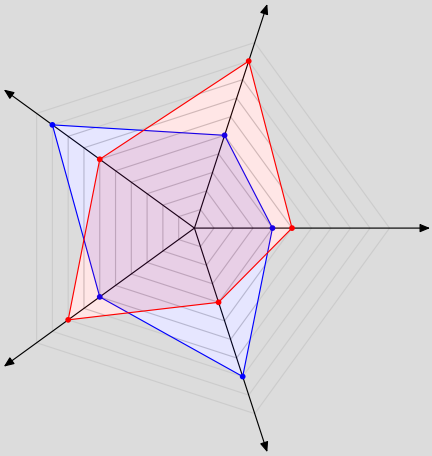
mpkiviat

Package METAPOST to draw Kiviat diagrams



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Version 0.1, 22th of may 2024
https://gitlab.gutenberg-asso.fr/mchupin/mpkiviat

Abstract

This METAPOST package allows to draw Kiviat diagram (or radar chart, web chart, spider chart, etc.).

Contents

1 Introduction

`mpkiviat` is a package to draw Kiviat diagram (web chart, spider chart, spider graph, spider web chart, star chart, star plot, cobweb chart, irregular polygon,or polar chart) with METAPOST [6].

2 Installation

`mpkiviat` is on CTAN and can also be installed via the package manager of your distribution.

https://www.ctan.org/pkg/mpkiviat

2.1 With TEXlive under Linux or macOS

To install `mpkiviat` with TEXLive, you will have to create the directory `texmf` in your `home`.

```
user $> mkdir ~/texmf
```

Then, you will have to place the `mpkiviat.mp` file in

`~/texmf/metapost/mpkiviat/`

Once this is done, `mpkiviat` will be loaded with the classic METAPOST input code

```
input mpkiviat
```

2.2 With MikTEX and Windows

These two systems are unknown to the author of `mpkiviat`, so we refer you to the MikTEXdocumentation concerning the addition of local packages:

`http://docs.miktex.org/manual/localadditions.html`

2.3 Dependencies

`mpkiviat` depends, of course on METAPOST [6], as well as the packages and—if `mpkiviat` is not used with LuaLATEX [3, 5] and the luamplib or minim-mp [1, 4] packages—the latexmp [2] package.

3 Axis and lattice

`set_axis(`⟨*list of axis names*⟩`)`

The ⟨*list of axis names*⟩ is a list delimited by commas with the names of the different axis as `string` (e.g. `"Légumes","Fruits","Produits laitiers"`).

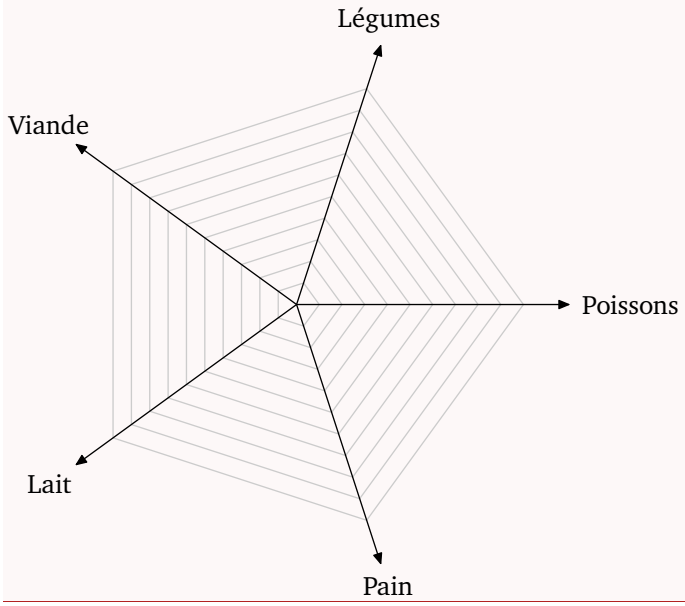
The command to draw the Kiviat background is the following:

`draw_axis`

The combinaison of these two commands produces, for example:

Exemple 1

```
input mpkiviat;
beginfig(1);
set_axis("Légumes","Viande","Lait","Pain","Poissons");
draw_axis;
endfig;
```



By default, legend of each axis are written, but you can avoid that using the following command:

`set_axis_legends(`⟨*boolean*⟩`)`

⟨***boolean***⟩: `true` or `false`

Default value for each axis is 10, and there is 10 steps for the lattice. You can redefine that with the following command that *should be set before the drawing command* :

`set_lattice_grid(`⟨*unit*⟩`,`⟨*max*⟩`)`

⟨***unit***⟩: (`numeric`) is the interval between two lines of the lattice;

⟨***max***⟩: (`numeric`) is the maximum value for each axis.

You can print the graduations for the lattice with the following command:

`draw_grad(`⟨*prefix*⟩`,`⟨*suffix*⟩`,`⟨*axis number*⟩`)`

⟨***prefix***⟩**:** (`string`) is a string to add before each graduation;

⟨***suffix***⟩**:** (`suffix`) is a string to add after each graduation;

⟨***axis number***⟩**:** (`numeric`) is an integer to choose the axis used for printing the graduations.

`mpkiviat` defines a unit that can be modified to scale the entire graph with the following command (that must be used before the command `set_axis`).

`set_kiviat_unit(`⟨*unit*⟩`)`

⟨***unit***⟩**:** (`string`, default 0.3 cm) is the unit to draw the graph.

One can set colors for the axis and the lattice with the two following commands.

`set_axis_color(`⟨*color*⟩`)`

⟨***color***⟩**:** (`color`) is the color for drawing the axis arrows.

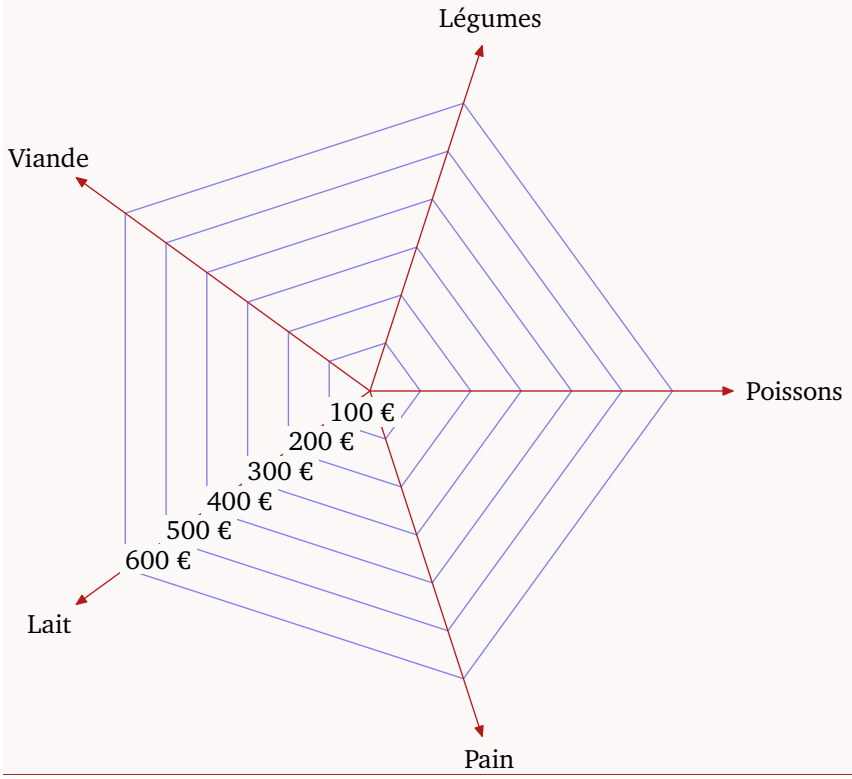
`set_lattice_color(`⟨*color*⟩`)`

⟨***color***⟩**:** (`color`) is the color for drawing the lattice.

The following example illustrates some of the previous commands.

Exemple 2

```
input mpkiviat;
beginfig(1);
set_kiviat_unit(0.4cm);
set_axis("Légumes","Viande","Lait","Pain","Poissons");
set_axis_color((0.7,0.1,0.1));
set_lattice_color((0.5,0.5,0.9));
set_lattice_grid(100,600);
draw_axis;
draw_grad("","€~",3);
endfig;
```



4 Add lines

Once you have drawn the background, you can add lines for your Kiviat diagram. The basic command to do that is the following:

`draw_line(`⟨*list of values*⟩`)(`⟨*color*⟩`)`

⟨***list of value***⟩: (list of `string`) values for the different axis of the Kiviat diagram (e.g. `"9","2","3"`). The values must match the settings of the lattice.

⟨***color***⟩: (`color`) is the color for drawing the line.

You can also draw and fill a Kiviat line with the following command:

`filldraw_line(`⟨*list of values*⟩`)(`⟨*color*⟩`)`

⟨***list of value***⟩: (list of `string`) values for the different axis of the Kiviat diagram (e.g. `"9","2","3"`). The values must match the settings of the lattice.

⟨***color***⟩: (`color`) is the color for drawing the line. The filling color is transparent[a]

[a] Thanks to Anthony Phan METAPOST code : http://www-math.univ-poitiers.fr/~phan/metalpha.html.

By default, there is mark on a Kiviat line. You can remove marks with the following command, setting the booelan argument to `false`.

`set_line_mark(`⟨*boolean*⟩`)`

⟨***boolean***⟩: `true` or `false`

You can also choose the type of mark. `mpkiviat` provides three types : `"square"`, by default, `"circle"` and `"custom"`. To choose one of them, you have to use the following command:

`set_line_mark_type(`⟨*type*⟩`)`

⟨***type***⟩: (`string`) `"square"`, by default, `"circle"` and `"custom"`.

If you choose `custom`, you will have to define a macro `line_mark_custom` that take a `pair` as argument and that define a cycled path shifted around the `pair`. For instance, the `line_mark_square` command is defined as:

```
def line_mark_square(expr p)=
  (((-1,-1)--(1,-1)--(1,1)--(-1,1)--cycle scaled _line_mark_scale)
      shifted p)
enddef;
```

You can adjust the size of the marks using the following scaling macro:

`set_line_mark_scale(`⟨*scaling factor*⟩`)`

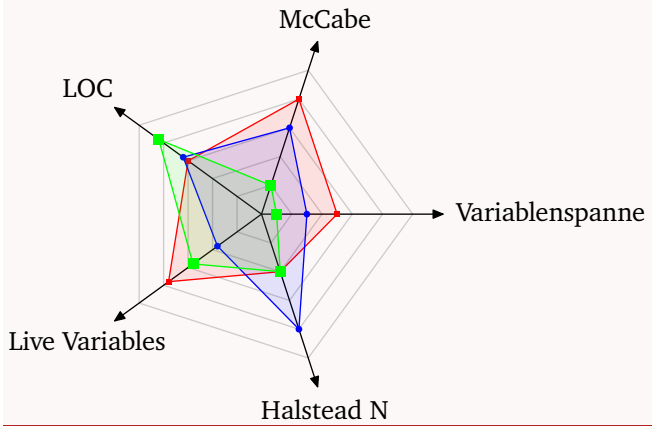
⟨***scaling factor***⟩**:** is a `numeric` that is, by default, 1.

Here is an example that illustrates some of the previous commands.

Exemple 3

```
input mpkiviat;
beginfig(1);
set_lattice_grid(100,500);
set_kiviat_unit(0.4cm);
set_axis("McCabe","LOC","Live Variables","Halstead N","Variablenspanne");
draw_axis;

filldraw_line(400,300,380,200,250)(red);
set_line_mark_type("circle");
filldraw_line(300,320,180,400,150)(blue);
set_line_mark_type("square");
set_line_mark_scale(2);
filldraw_line(100,420,280,200,50)(green);
endfig;
```



5 Legends

`mpkiviat` provides the following command to add legends to a Kiviat diagram:

`draw_legends.`⟨*place*⟩`(`⟨*list of names*⟩`)`

⟨***place***⟩**:** is one of the standard METAPOST suffixes : empty, `lft`, `rt`, `top`, `bot`, `ulft`, `urt`, `llft` and `lrt`. The legend is placed at the given place of the bounding box of the

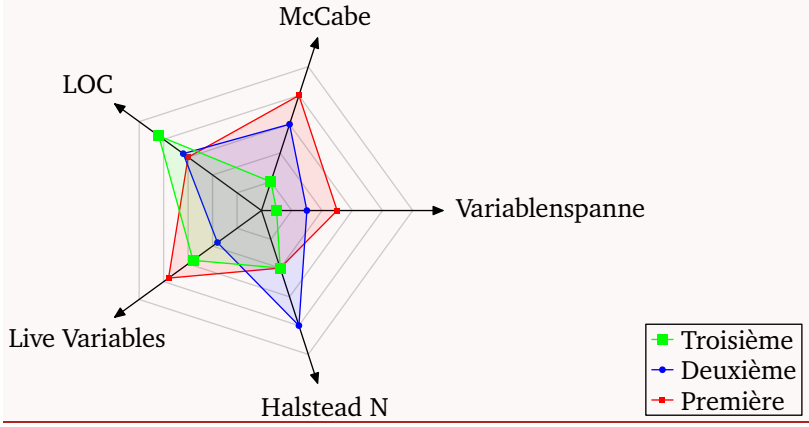
complete Kiviat diagram (without the legend). If it is empty, the default place is `rt`.

⟨***list of names***⟩**:** is the list of `string` of names for the different lines in the order of the construction.

Exemple 4

```
input mpkiviat;
beginfig(1);
set_lattice_grid(100,500);
set_kiviat_unit(0.4cm);
set_axis("McCabe","LOC","Live Variables","Halstead N","Variablenspanne");
draw_axis;

filldraw_line(400,300,380,200,250)(red);
set_line_mark_type("circle");
filldraw_line(300,320,180,400,150)(blue);
set_line_mark_type("square");
set_line_mark_scale(2);
filldraw_line(100,420,280,200,50)(green);
draw_legends.lrt("Première", "Deuxième", "Troisième");
endfig;
```



References

[1] Hans Hagen et al. *The* `luamplib` *package. Use LuaTeX's built-in MetaPost interpreter*. Version 2.30.0. May 10, 2024. URL: https://ctan.org/pkg/luamplib.

[2] Jens-Uwe Morawski. *The* `latexMP` *package. Interface for LaTeX-based typesetting in MetaPost*. Version 1.2.1. June 21, 2020. URL: https://ctan.org/pkg/latexmp.

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[4] Esger Renkema. *The* `minim-mp` *package. Low-level mplib integration for LuaTeX*. Version 2024/1.6. Apr. 6, 2024. URL: https://ctan.org/pkg/minim-mp.

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