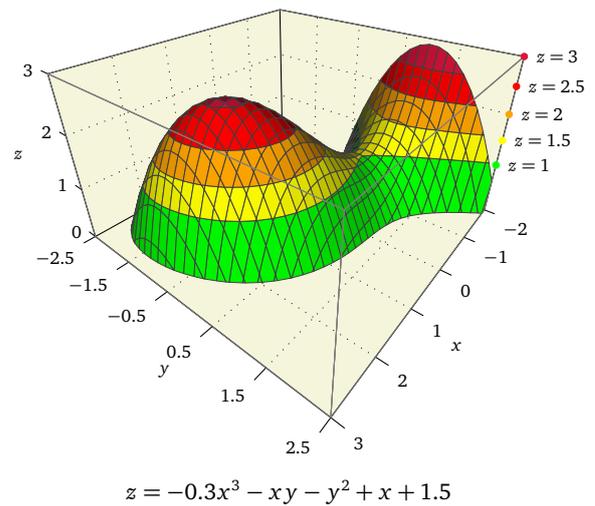
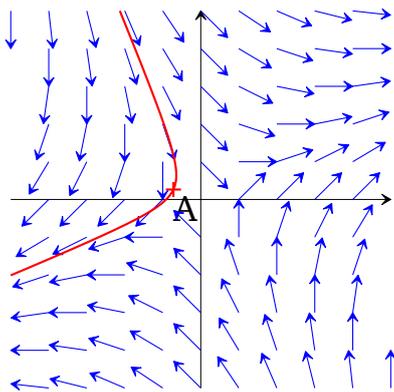
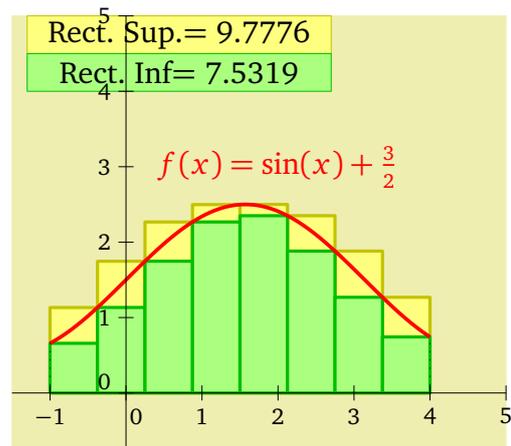
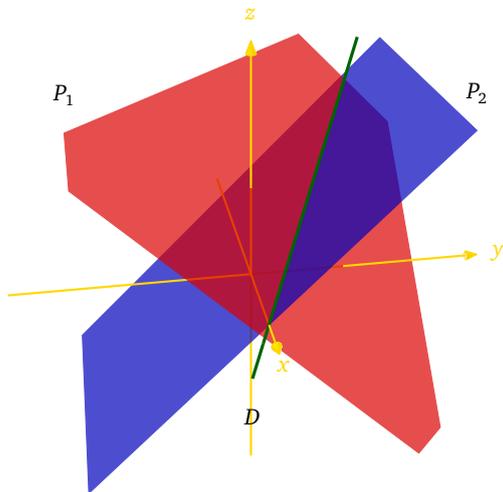


Aide de TEXGRAPH 1.974



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Chapitre I

Introduction to TeXgraph

1) First overview

- TeXgraph is a program for creating graphics for maths (ie : drawing curves, surfaces, building geometric figures...) and exporting as text file using formats : LaTeX (eepic macros), PsTricks, Pgf/Tikz (macros pgf), Eps, Psf (eps+Psf), pdf (eps -> pdf conversion), svg... There are also specific exports dedicated to 3D scenes.
- It has been written for Windows and Linux.
- TeXgraph version 1.974 is distributed under the GPL (General Public Licence) terms.
This release was written using Free Pascal with Lazarus (0.9.31 Svn).
This program is free, you are allowed to redistribute and/or modify it under the terms of the GNU General Public Licence published by the Free Software Foundation (version 2 or later).
This program is distributed because potentially useful, but WITHOUT ANY GUARANTEE, neither explicit nor implicit, including selling guaranties or adaptating guaranties in a specific aim. Please report to the GNU General Public Licence for further details.
You must have recieved a copy of the GNU General Public Licence with this program ; otherwise, ask for one and write to the Free Software Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA 02111-1307, États-Unis.
- You may help the author and the community by letting us know the bugs you encounter :
By Email texgraph@tuxfamily.org
or mail to :

Patrick FRADIN
La Jauvigère
17, Impasse du Vieux Château
16590 BRIE

- The TeXgraph program can be downloaded at <http://texgraph.tuxfamily.org/>
You may find examples there and on the site :<http://melusine.eu.org/syracuse/>.(in french)
- An forum is available (in french at the moment) at :<http://texgraph.tuxfamily.org/forum/>

2) Launching TeXgraph

The program needs to be installed (see the *LisezMoi.txt* file), the executable is called *TeXgraph*, and is launched with a script : **startTeXgraph**.

The installation directory is containing the *TeXgraph* directory where you'll find the executables and other directories : *Exemples, doc et macros*.

TeXgraph is handling three kinds of files : the source files (*.teg), the model files (*.mod) and the macro files (*.mac).

- The *.teg files : These are the ordinary source files. You have them as you save a graphic made with the program.
- The *.mod files : these are the modele files that can be loaded, we can consider those as ready to use source file that can be completed.
- The *.mac : these are the macro files and are to be loaded. Those may also include variable declarations. On the contrary to the first two file types, **all the code within a *.mac file is considered as predefined** and won't be saved with the graphic (but the source file will contain a command to load that macros file).

These three file types follow the same syntax rules, as described in the *src4latex* (p. 150) section.

At program launch, several macro files are loaded : *TeXgraph.mac*, *couleurs.mac*, *scene3d.mac* and *interface.mac* (the later is only loaded by the GUI). Those files are considered as predefined and will stay in memory during the whole session until the program is closed.

It's also possible to load one or several other macro files at program launch by adding those as parameters in the command line . On the same way, the macros loaded are considered as predefined and will be removed from memory at the end of the session, ie : the closing of the program.

A macro file is loaded using the *File/Load Macros*. The variables and macros loaded are also considered as predefined and won't be part of the graphics. **Tough, these will be removed from memory at the next graphic file loading** . The variables and macro loaded with the *Filer/Import a model* are added to the current file, will be saved with it, and **will be removed at the next graphic file loading**

For a satisfying user experience with TeXgraph, your system should come with :

1. A working T_EX distribution, including the *tikz/pgf*, *pstricks* packages.
2. The **ImageMagic** software suite mandatory to convert images (*Snapshot* button or animated gifs from the *Animation.mod* model).
3. The **swftools** if you use the *Animation.mod* model and export using Flash format.
4. The **pstoedit** program is needed to convert compiled T_EX formulas into paths.
5. The **povray** program if you use the *povray.mod* model.

If you also intend to use the **geom** and **jvx** 3D exports, you'll need to visualize the results using :

1. The **geomview** program : with the *.*geom* files.
2. The **javaview** program : with the *.*jvx* files. This program can be run locally, and as an applet in a web page as we can see [on that page](#).

These programs are all free software available for linux and windows.

3) Graphic compositing

A TeXgraph graphic is made of :

- **Parameters** (p. 10) : like graphic window coordinates, axes scales, margins....
- **Global Variables** (p. 33) : These are mostly a list of complex numbers, eventually the *Nil* value.
- **Macros** (p. 34) : useful to simplify the graphic compositing.
- **Graphic Elements** (p. 13) : like axes, curves,...

4) Parameters

These correspond to the *Preferences* menu item, with the options :

- **Window** : to specify the working rectangular area where the drawing is done. Here, the **Xmin, Xmax, Ymin, Ymax** constants are set, then the two axes scale : **Xscale, Yscale** (centimeters). The constants can be reused in commands, but not directly modified, unless you use the *Fenetre* (p. 41) command. There is an orthonormal frame with $Xscale=Yscale$.
- **Margins** : to set margins around the graphic in case of text overflow using labels for example. The constant's value are set : **margeG, margeD, margeH, margeB** (centimeters). The constants can be reused in commands, but not directly modified, unless you use the *Marges* (p. 45) command.
- **Export the border** : In case of this option is selected, there will be a framework around the drawing at exportation, and on the screen. The frame is a plain black line englobing the margins. That option can be modified using the *Border* (p. 36) command.
- **Export colors** : In case of this option is not selected, the graphic will be exported with gray scale colors.
- **Export names** : In case of this option is selected, the name of each graphic element will be added in the exported file right before the drawing of the element as a remark. This makes easier to find LaTeX, pgf or pstricks code in the exportations and modify it if necessary.
- **Print global variables** : In case of this option is selected, the global variables are printed on screen (not exported). This can be useful while preparing a drawing.
- It's also possible to hide the right and/or left column of the graphic interface, and to show/hide the label's anchor.

5) Colors

5.1 Predefined colors

The predefined color list can be found on the page : [couleurs.html](#).

5.2 Commands and macros linked with colors

- **Lcolor**(*<color>* [, *gray scale*]) : macro that shows the three components red, green, blue of the given color in a list-form [r,g,b]. The second argument is not mandatory, is 0 by default, if set to 1, the color is converted into gray scale before computing the components.
- **Bcolor**(*<color>*) : macro that shows the blue level of the given color.
- **Gcolor**(*<color>*) : macro that shows the green level of the given color.
- **Rcolor**(*<color>*) : macro that shows the red level of the given color.
- **Cplcolor**(*<color>*) : macro that shows the complementary color level of the given color.
- **Dark**(*<color>*, *<factor>*) : macro that is doing a barycenter between the color and the black, the factor is a number in the interval [0;1] and is the proportion of black color (1=100%).
- **Light**(*<color>*, *<factor>*) : macro that is doing a barycenter between the color and the black, the factor is a number in the interval [0;1] and is the proportion of white (1=100%).
- **GrayScale**(*<0/1>*) : that command is described *here* (p. 42). It is used to activate/desactivate the color conversion into gray scale.
- **HexaColor**(*<Hexa value>*) : The command is described *here* (p. 42). Example : `Color :=HexaColor("F5F5DC")`.
- **MixColor**(*<color1>*, *<proportion1>*, *<color2>*, *<proportion2>*, ..., *<colorN>*, *<proportionN>*) : macro that returns the color (rgb) obtained after combining the given colors and its corresponding proportions.
- **Palette**(*<[Color1, Color2, ..., ColorN]>*, *<factor in [0;1]>*) : returns one color from the given palette in function of the factor, 0 for the first color, and 1 for the last.
- **Hsb**(*<hue (0..360)>*, *<saturation (0..1)>*, *<brightness (0..1)>*) : macro that returns a color from its components hue, saturation and brightness. Example : `Color :=Hsb(60,1,1)`.
- **HueColor**(*<color>*) : returns the hue color's component.
- **SatColor**(*<couleur>*) : returns the saturation color's component.
- **BrightColor**(*<couleur>*) : returns the brightness color's component.
- **ColorJump**(*<color>*) : macro that returns the constant *jump* and the *<color>* as the imaginary part. The *Ligne* (p. 84) command read the value and uses it as the fill color if the *Fillstyle* variable is empty (value *none*).
- **Rgb**(*<red (0..1)>*, *<green (0..1)>*, *<blue (0..1)>*) : the command is described *here* (p. 50). Example : `Color :=Rgb(0.5, 1, 0.6)`.
- **RgbL**(*<[red, green, blue]>*) : The macro has the same effect as *Rgb*, appart from the fact that the three component are in a list.
- **Ryb**(*<red (0..1)>*, *<yellow (0..1)>*, *<blue (0..1)>*) : macro that returns a color from its components red, yellow, blue. Example : `Color :=Ryb(0.5, 0.8, 0.6)`.
- **Rgb2Hsb**(*<couleur>*) : macro for converting a color (rgb) into an Hsb color, ie a list [hue, saturation, brightness].
- **Rgb2Hexa**(*<color Rgb>*) : returns the string representing the Hexadecimal color code, eg : "FF0000" for the red color.
- **Rgb2Gray**(*<color Rgb>*) : returns the gray scale color (rgb form).

Exemple(s): Each face is coloured according to the rating of the center of gravity. The color is added thanks to the *ColorJump* macro in the *jump* ending face constant. The *Hsb* macro is able to make the color continuously varying. Before drawing the surface, the faces are sorted using the *SortFacet* (p. 112) command, then are drawn.

```

\begin{texgraph}[name=ColorJump, file]
Graph image = [
view(-6.5,6,-6.5,5.5),
Marges(0,0,0),size(7.5),
view3D(-3,3,-3,3),ModelView(central),
S :=GetSurface([u+i*v,2*sin(u)+cos(v),
-3+3*i,-3+3*i),
stock :=for facette in S By jump do
z :=Zde(isobar3d(facette)),
facette,
ColorJump(Hsb(270*(Zsup-z)/(Zsup-Zinf),1,1))
od,
FillStyle :=full, LabelSize :=footnotesize,
BoxAxes3D(grid :=1, FillColor :=lightblue),
Ligne3D(SortFacet(stock),1)
];
\end{texgraph}

```

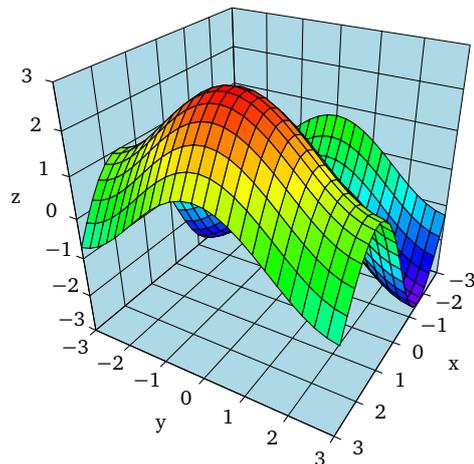


FIGURE 1: *Heat type colouring*

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