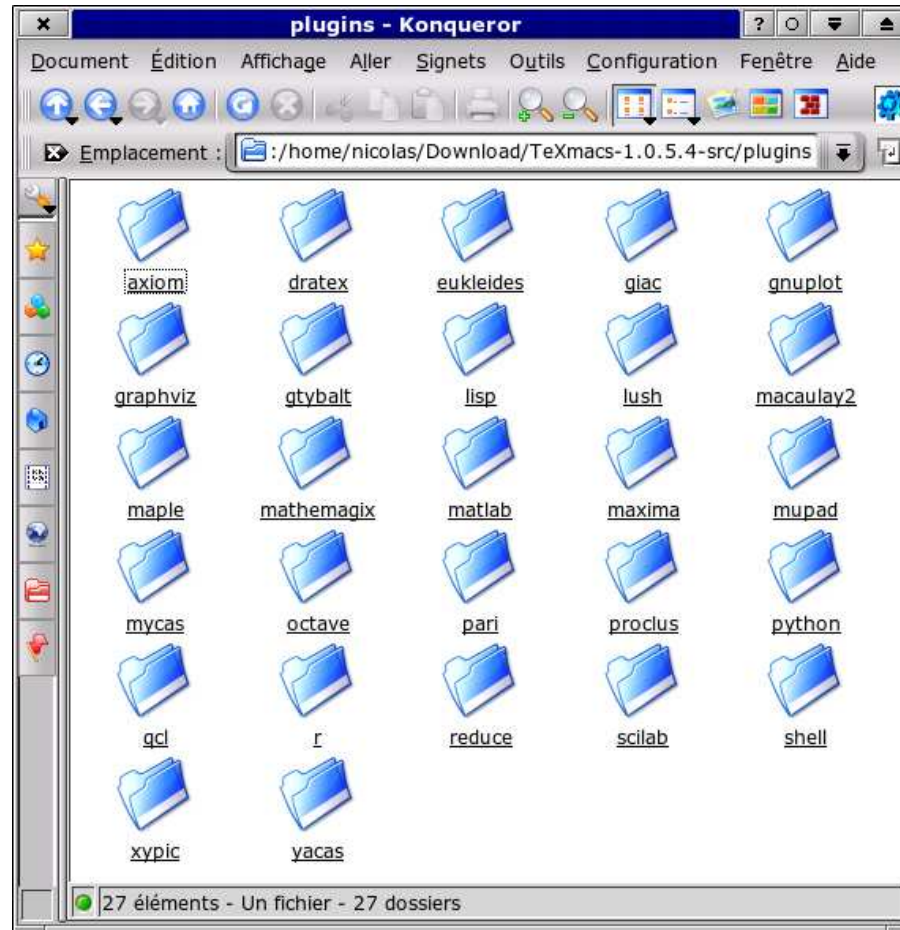


Using plugins to insert technical figures

Nicolas Ratier

1. $\text{T}_{\text{E}}\text{X}_{\text{MACS}}$ plugins
2. DraTeX/AIDraTeX
3. Gnuplot
4. Graphviz
5. Xy-pic

1. T_EX_{MACS} plugins



- Computer Algebra system

axiom	
giac	
gtybalt	
macaulat 2	Algebraic geometry and commutative algebra
maple	
mathemagix	
maxima	
mupad	
mycas	
pari	Number theory
reduce	
yacas	

- Numerical Computations Software

lush	
matlab	
octave	
qcl	Simulation of quantum algorithms
r	Statistical computing
scilab	

- Drawing Programs

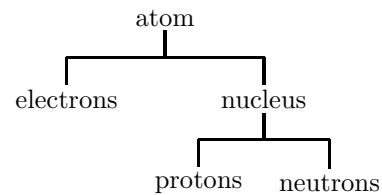
dratex	Drawing different types of charts and diagrams
gnuplot	Data and function plotting
graphviz	Automatic graph visualization
xypic	Commutative diagrams

2. DraTeX/AIDraTeX

- DraTeX provides commands for drawing basic shapes like lines, rectangles, and Bezier curves, and for defining utilities that produce more complex outcomes.
- AIDraTeX provides templates for drawing different types of charts and diagrams.

TeXmacs interface to (Al)DraTeX (High Level Drawing Facilities)

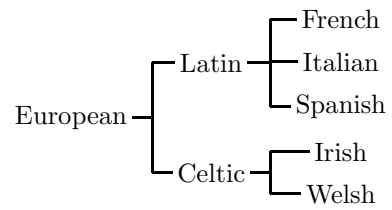
```
DraTeX] \Draw
        \Tree()(
          2,atom //
          0,electrons & 2,nucleus //
          0,protons & 0,neutrons //)
        \EndDraw
```



```
DraTeX]
```

```
DraTeX]
```

```
DraTex] \Draw
        \TreeAlign(H,0,0)(0,0,0)
        \TreeSpace(S,5,15)
        \Tree()(
        2,European //
        3,Latin & 2,Celtic //
        0,French & 0,Italian & 0,Spanish & 0,Irish & 0,Welsh //)
        \EndDraw
```



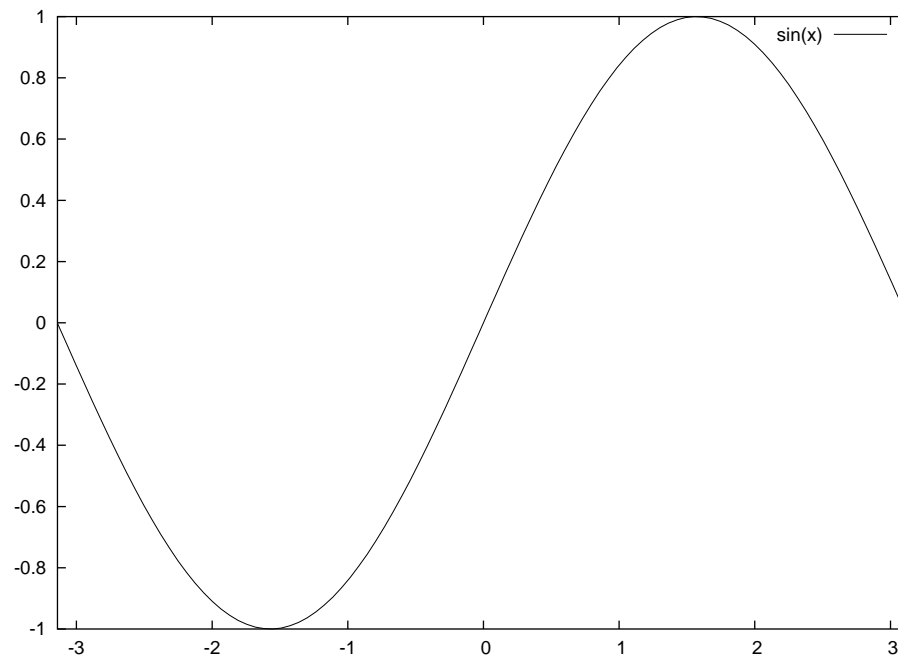
```
DraTex]
```

3. Gnuplot

- Gnuplot is a portable command-line driven interactive data and function plotting utility. Gnuplot supports many types of plots in either 2D and 3D. It can draw using lines, points, boxes, contours, vector fields, surfaces, and various associated text. It also supports various specialized plot types.

This is a TeXmacs interface for GNUplot.

```
GNUplot] plot [-3.14:3.14] sin(x)
```



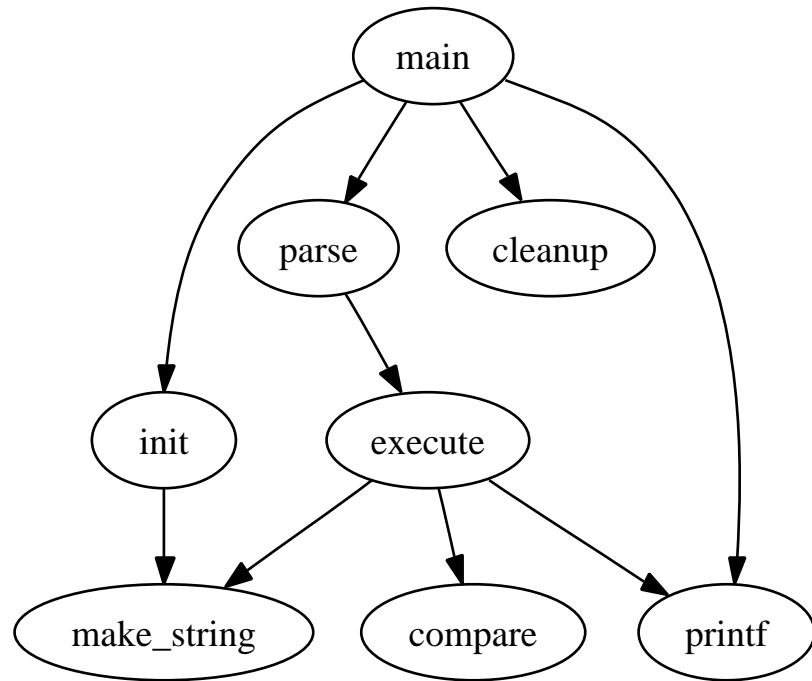
```
GNUplot]
```

4. Graphviz

- Graph visualization is a way of representing structural information as diagrams of abstract graphs and networks.
- Graphviz is an automatic graph visualization software. The Graphviz layout programs take descriptions of graphs in a simple text language, and make diagrams in several useful formats such as Postscript for inclusion in $\text{T}_{\text{E}}\text{X}_{\text{MACS}}$.

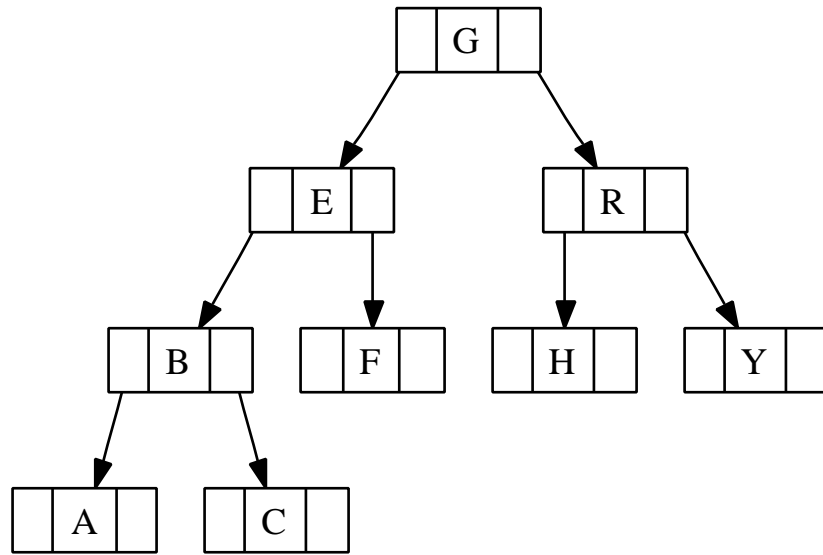
Welcome to a simple TeXmacs interface to Graphviz/dot
(C) 2002 Jorik Blaas and Joris van der Hoeven

```
Graphviz 1] digraph G {  
    main -> parse -> execute;  
    main -> init;  
    main -> cleanup;  
    execute -> make_string;  
    execute -> printf;  
    init -> make_string;  
    main -> printf;  
    execute -> compare;  
}
```

Graphviz 2]

```
Graphviz 3] digraph g {
  node [shape = record, height = 0.1];
  node0[label = "<f0> | <f1> G | <f2> "];
  node1[label = "<f0> | <f1> E | <f2> "];
  node2[label = "<f0> | <f1> B | <f2> "];
  node3[label = "<f0> | <f1> F | <f2> "];
  node4[label = "<f0> | <f1> R | <f2> "];
  node5[label = "<f0> | <f1> H | <f2> "];
  node6[label = "<f0> | <f1> Y | <f2> "];
  node7[label = "<f0> | <f1> A | <f2> "];
  node8[label = "<f0> | <f1> C | <f2> "];
  "node0":f2 -> "node4":f1;
  "node0":f0 -> "node1":f1;
  "node1":f0 -> "node2":f1;
  "node1":f2 -> "node3":f1;
  "node2":f2 -> "node8":f1;
  "node2":f0 -> "node7":f1;
  "node4":f2 -> "node6":f1;
  "node4":f0 -> "node5":f1;
}
```



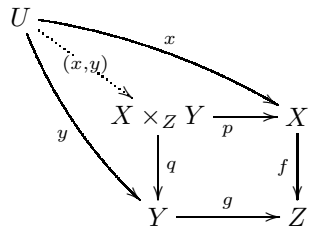
Graphviz 4]

5. Xy-pic

- xypic is a package for typesetting “matrix-like” diagrams, such as commutative diagrams. In category theory, “commutative diagrams” are the categorists ways to illustrate equations and universal properties.

TeXmacs interface to XYPic (high level 2-dimensional graphics)

```
XYpic] \xymatrix{
  U \ar@/_/[ddr]_y \ar@/^/[drr]^x \ar@{.>}[dr]|-{(x,y)} \\
  & X \times_Z Y \ar[d]^q \ar[r]_p & X \ar[d]_f \\
  & Y \ar[r]_g & Z
```



XYpic]

XYpic]

```

XYpic] \xymatrix@!=2.5pc{
  X_{d_1(\theta)} \arrr^{-\{\gamma_\theta\}} \ar@{^(->)}[d] && X_{d_0(\theta)} \\
  X_{d_0(\theta)} \ar@{^(->)}[d] && \\
  \coprod_{\theta \in \mathcal{C}_1} X_{d_1(\theta)} \approx \mathcal{C}_1 \times_{\mathcal{C}_0} X && X \\
  \arrr^{-\gamma} \ar[d]_{pr_1=d_1^*x} && \ar[d]_x \\
  \mathcal{C}_1 && \mathcal{C}_0 \\
  \arrr^{-d_0} &&
}

```

$$\begin{array}{ccc}
 X_{d_1(\theta)} & \xrightarrow{\gamma_\theta} & X_{d_0(\theta)} \\
 \downarrow & & \downarrow \\
 \coprod_{\theta \in \mathcal{C}_1} X_{d_1(\theta)} \approx \mathcal{C}_1 \times_{\mathcal{C}_0} X & \xrightarrow{\gamma} & X \\
 \downarrow pr_1=d_1^*x & & \downarrow x \\
 \mathcal{C}_1 & \xrightarrow{d_0} & \mathcal{C}_0
 \end{array}$$

XYpic]