

Documentation of `mptrees.mp`

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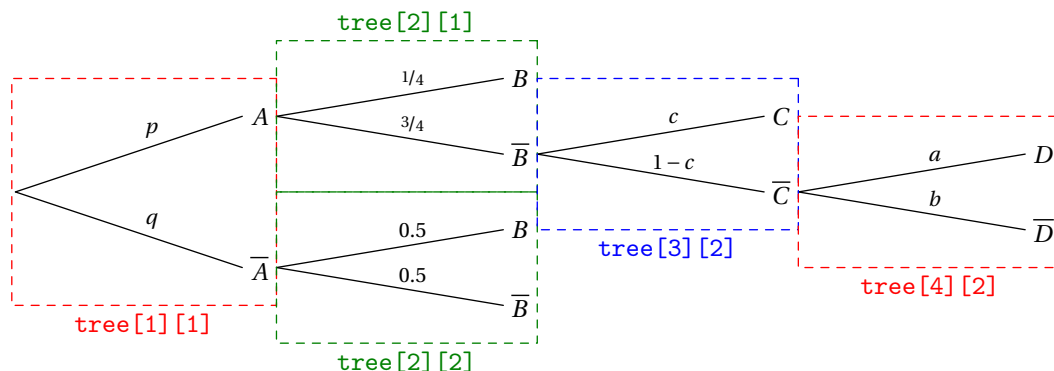
1 Overview

This package is intended to simplify the drawing of probability trees with METAPOST. It provides one command and several parameters to control the output.

It can be used in standalone files with two compilations (`latexmp` package is loaded) but it can also be used with Lua^AT_EX and `luamplib` package.

`tree[i][j](dim1,dim2,...)(ev1,prob1,ev2,prob2,...)` probability tree located in column `i` and row `j` (see figure below). `dim1, dim2,...` can be numerics or pairs and control the dimension of the tree. `ev1, prob1...` are strings and will be printed (using `latexmp`) at the end of the edge (the event) and above the edge (the probability).

`shiftev`, `scaleprob`, `posprob`, `typeprob`, `proboffset`, `dirtree` numerics controlling the scale and position of the probability label, the direction of the tree...



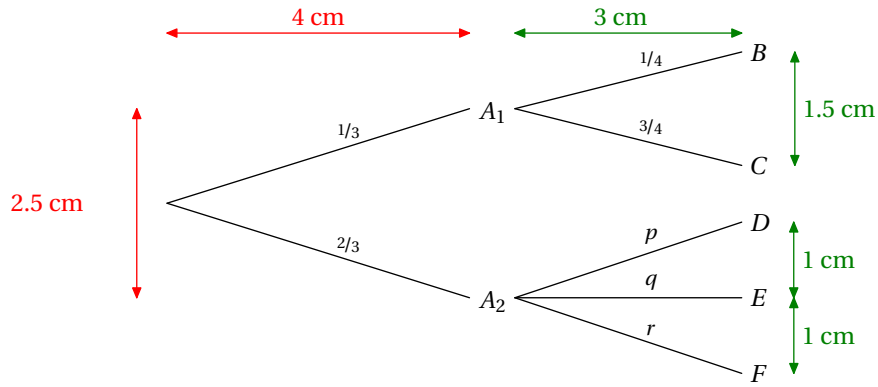
2 Different kinds of trees

`tree[i][j](width,vspace)(ev1,prob1,ev2,prob2,...)` regular tree where `width` is the horizontal width of the tree and `vspace` the vertical space between two consecutive nodes.

Example 1

```
beginfig(1)
draw tree[1][1](4cm,2.5cm)("$A_1$", "\nicefrac{1}{3}$", "$A_2$", "\nicefrac{2}{3}$");
draw tree[2][1](3cm,1.5cm)("$B$", "\nicefrac{1}{4}$", "$C$", "\nicefrac{3}{4}$");
draw tree[2][2](3cm,1cm)("$D$", "$p$", "$E$", "$q$", "$F$", "$r$");
endfig;
```

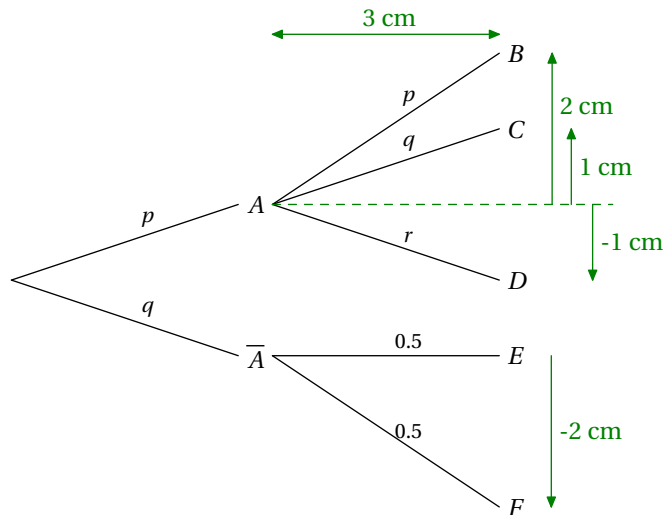
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`tree[i][j](width,vspace1,vspace2...)(ev1,prob1,ev2,prob2,...)` tree where `width` is the horizontal width of the tree while each `vspace` indicates the vertical space between the node and the origin of the tree.

Example 2

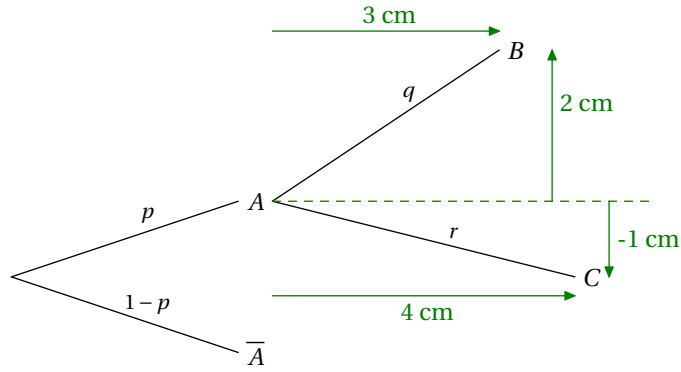
```
beginfig(2)
draw tree[1][1](3cm,2cm)("$A$","$p$","$\overline{A}$","$q$");
draw tree[2][1](3cm,2cm,1cm,-1cm)("$B$","$p$","$C$","$q$","$D$","$r$");
draw tree[2][2](3cm,0cm,-2cm)("$E$","$0.5$","$F$","$0.5$");
endfig;
```



`tree[i][j](pair1,pair2,...)(ev1,prob1,ev2,prob2,...)` tree where `pair1`, `pair2...` indicate the coordinates of each node from the origin of the tree.

Example 3

```
beginfig(3)
draw tree[1][1](3cm,2cm)("$A$","$p$","$\overline{A}$","$1-p$");
draw tree[2][1]((3cm,2cm),(4cm,-1cm))("$B$","$q$","$C$","$r$");
endfig;
```



3 Parameters

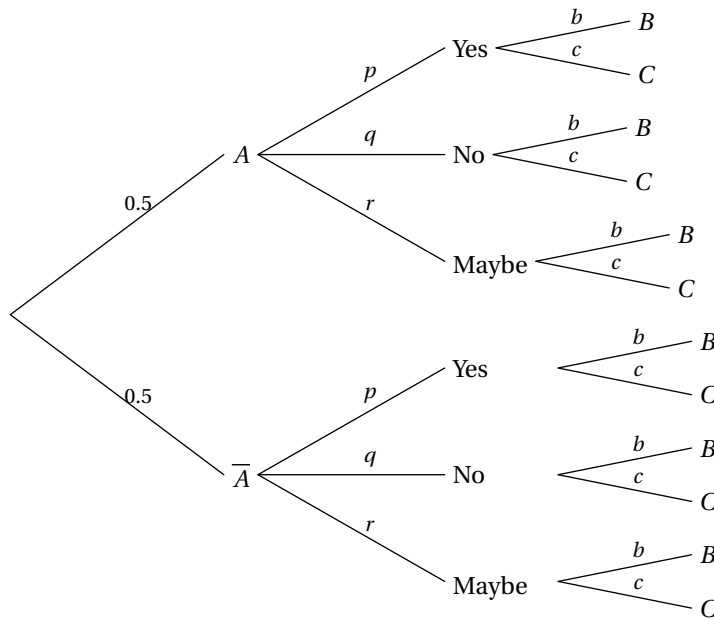
shifte The origin of each tree is located where the bounding box of the previous event's name ends. Thus subtrees may begin at different places. The numeric **shifte** indicates the horizontal space between the end of the edges and the beginning of following trees. It should be used inside the first set of parameters of the tree (see example below).

Example 4

```

beginfig(4)
draw arbre[1] [1] (80,120) ("A$", "$0.5$", "$\overline{A}$", "$0.5$");
draw arbre[2] [1] (70,40) ("Yes", "$p$", "No", "$q$", "Maybe", "$r$");
draw arbre[2] [2] (70,40, "shifte=1.5cm") ("Yes", "$p$", "No", "$q$", "Maybe", "$r$");
draw arbre[3] [1] (50,20) ("B$", "$b$", "C$", "$c$");
draw arbre[3] [2] (50,20) ("B$", "$b$", "C$", "$c$");
draw arbre[3] [3] (50,20) ("B$", "$b$", "C$", "$c$");
draw arbre[3] [4] (50,20) ("B$", "$b$", "C$", "$c$");
draw arbre[3] [5] (50,20) ("B$", "$b$", "C$", "$c$");
draw arbre[3] [6] (50,20) ("B$", "$b$", "C$", "$c$");
endfig;

```

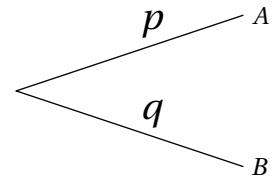


scaleprob numeric controlling the scale of the label above the edge (the probability). Default is 0.85.

posprob numeric controlling the position of the label above the edge. Default is 0.6.

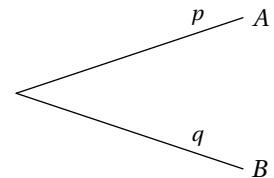
Example 5

```
beginfig(5)
  scaleprob:=1.5;
  draw tree[1][1](3cm,2cm)("$A$","$p$","$B$","$q$");
endfig;
```



Example 6

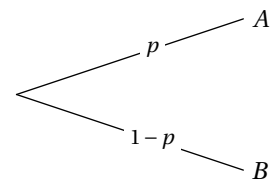
```
beginfig(6)
  posprob:=0.8;
  draw tree[1][1](3cm,2cm)("$A$","$p$","$B$","$q$");
endfig;
```



typeprob numeric controlling how the label is printed. Values can be 1 (the default, label is printed above the edge), 2 (the label is printed on the edge), 3 (the label is printed above the edge and rotated) or 4 (the label is printed on the edge and rotated).

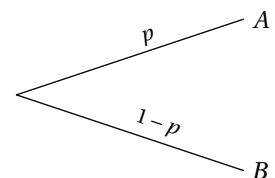
Example 7

```
beginfig(7)
  typeprob:=2;
  draw tree[1][1](3cm,2cm)("$A$","$p$","$B$","$1-p$");
endfig;
```



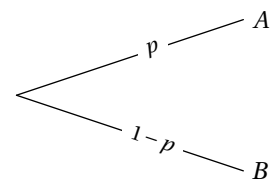
Example 8

```
beginfig(8)
  typeprob:=3;
  draw tree[1][1](3cm,2cm)("$A$","$p$","$B$","$1-p$");
endfig;
```



Example 9

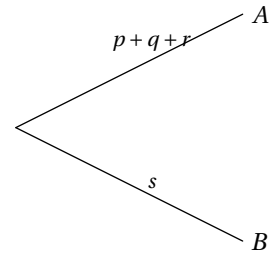
```
beginfig(9)
  typeprob:=4;
  draw tree[1][1](3cm,2cm)("$A$","$p$","$B$","$1-p$");
endfig;
```



proboffset numeric controlling the amount by which the label above the edge is offset. Default is labeloffset (3bp).

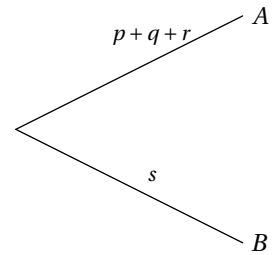
Example 10

```
beginfig(10)
  draw tree[1][1](3cm,3cm)("$A$","$p+q+r$","$B$","$s$");
endfig;
```



Example 11

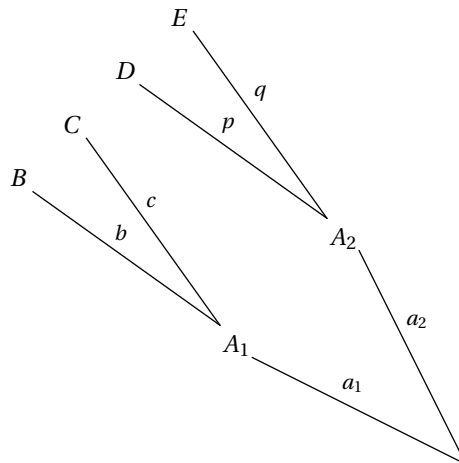
```
beginfig(11)
  proboffset:=6bp;
  draw tree[1][1](3cm,3cm)("$A$","$p+q+r$","$B$","$s$");
endfig;
```



dirtree All trees are construct horizontally by default. **ditree** indicates the angle in degrees between the horizontal and the main direction of the tree. Default is 0.

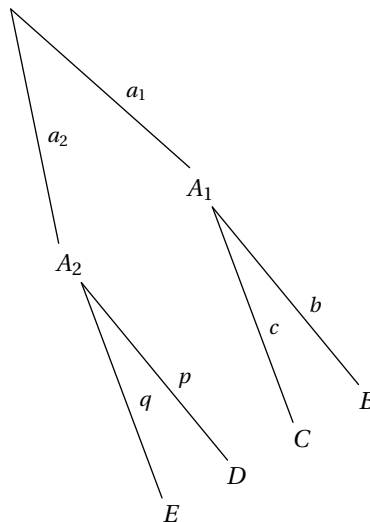
Example 12

```
beginfig(12)
dirtree:=135;
draw tree[1][1](3cm,2cm)("$A_1$","$a_1$","$A_2$","$a_2$");
draw tree[2][1](3cm,1cm)("$B$","$b$","$C$","$c$");
draw tree[2][2](3cm,1cm)("$D$","$p$","$E$","$q$");
endfig;
```



Example 13

```
beginfig(13)
dirtree:=-60;
draw tree[1][1](3cm,2cm)("$A_1$","$a_1$","$A_2$","$a_2$");
draw tree[2][1](3cm,1cm)("$B$","$b$","$C$","$c$");
draw tree[2][2](3cm,1cm)("$D$","$p$","$E$","$q$");
endfig;
```



4 Embedded code in \LaTeX files

You can embed your code in \LaTeX files.

4.1 With `pdftex`

Using `emp` package

```
pdflatex myfile.tex
mpost myfile.mp
mpost myfile.mp
pdflatex myfile.tex
```

```
\documentclass{article}
\usepackage{emp}
\usepackage{ifpdf}
\ifpdf % allows pdflatex compilation
\DeclareGraphicsRule{*}{mps}{*}{}
\fi
\begin{document}
\begin{empfile}
\begin{empcmds}
input mptrees;
\end{empcmds}
\begin{emp}(0,0)
draw tree[1][1](3cm,3cm)(...);
\end{emp}
\end{empfile}
\end{document}
```

Using `mpgraphics` package

```
pdflatex -shell-escape myfile.tex
```

```
\documentclass{article}
\usepackage[runs=2]{mpgraphics}
\begin{document}
\begin{mpdefs}
input mptrees;
\end{mpdefs}
\begin{mpdisplay}
draw tree[1][1](3cm,3cm)(...);
\end{mpdisplay}
\end{document}
```

4.2 With luatex

Using Lua^AT_EX

lualatex myfile.tex

```
\documentclass{article}
\usepackage{fontspec}
\usepackage{luamplib}
\begin{document}
\everymplib{input mptrees;}
\begin{mplibcode}
beginfig(1);
  draw tree[1][1](3cm,3cm)("$A$","$p$","$B$","$q$");
endfig;
\end{mplibcode}
\end{document}
```