'pst-circ'
A PSTricks package for drawing electric circuits
ver. 1.2b

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Abstract: 'pst-circ' is a PSTricks package to draw easily electric circuits. Most dipoles, tripoles and quadrupoles used in classical electrotechnical circuits are provided as graphical units which can readily be interconnectedd to produce circuit diagrams of a reasonable level of complexity

Contents

1 Introduction

The package **'pst-circ'** is a collection of graphical elements based on PStricks that can be used to facilitate display of electronic circuit elements. For example, an equivalent circuit of a voltage source, its source impedance, and a connected load can easily be constructed along with arrows indicating current flow and potential differences. The emphasis is upon the circuit elements and the details of the exact placement are hidden as much as possible so the author can focus on the circuitry without the distraction of sorting out the underlying vector graphics.

2 Usage

2.1 Parameters

There are specific paramaters defined to change easily the behaviour of the pst-circ objects you are drawing.

intensity (**boolean**): (*default: false*)
intensitylabel (**string**): (*default: \empty*)
intensitylabeloffset (**dimension**): (*default: 0.5*)
intensitycolor (**PSTricks color**): (*default: black*)
intensitylabelcolor (**PSTricks color**): (*default: black*)
intensitywidth (**dimension**): (*default: \pslinewidth*)

tension (**boolean**): (*default: false*)
tensionlabel (**string**): (*default: \empty*)
tensionoffset (**dimension**): (*default: 1*)
tensionlabeloffset (**dimension**): (*default: 1.2*)
tensioncolor (**PSTricks color**): (*default: black*)
tensionlabelcolor (**PSTricks color**): (*default: black*)
tensionwidth (**dimension**): (*default: \pslinewidth*)
labeloffset (**dimension**): (*default: 0.7*)
labelangle (**PSTricks label angle**): (*default: 0*)
dipoleconvention: (*default: receptor*)
directconvetion (**boolean**): (*default: true*)
dipolestyle (**string**): (*default: normal*)
variable (**boolean**): (*default: false*)
parallel (**boolean**): (*default: false*)
parallelarm (**dimension**): (*default: 1.5*)
parallelsep (**real**): (*default: 0*)
parallelnode (**boolean**): (*default: false*)
intersect (**boolean**): (*default: false*)
intersectA (**node**):
intersectB (**node**):
OAinvert (**boolean**): (*default: true*)
OAperfect (**boolean**): (*default: true*)
OAiplus (**boolean**): (*default: false*)
OAiminus (**boolean**): (*default: false*)
OAiout (**boolean**): (*default: false*)
OAipluslabel (**string**): (*default: \empty*)
OAiminuslabel (**string**): (*default: \empty*)
OAioutlabel (**string**): (*default: \empty*)
transistorcircle (**boolean**): (*default: true*)
transistorinvert (**boolean**): (*default: false*)
transistoribase (**boolean**): (*default: false*)
transistoricollector (**boolean**): (*default: false*)
transistoriemitter (**boolean**): (*default: false*)
transistoribaselabel (**string**): (*default: \empty*)
transistoricollectorlabel (**string**): (*default: \empty*)
transistoriemitterlabel (**string**): (*default: \empty*)
transistortype (**string**): (*default: PNP*)
primarylabel (**string**): (*default: \empty*)
secondarylabel (**string**): (*default: \empty*)
transformeriprimary (**boolean**): (*default: false*)
transformerisecondary (**boolean**): (*default: false*)
transformeriprimarylabel (**string**): (*default: \empty*)
transformerisecondarylabel (**string**): (*default: \empty*)
tripolestyle (**string**): (*default: normal*)

3 Macros

3.1 Dipole macros
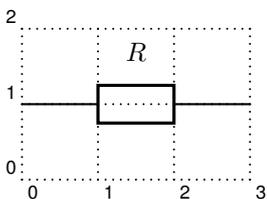

```
\pnode(0,1){A}
\pnode(3,1){B}
\resistor(A)(B){$R$}
```
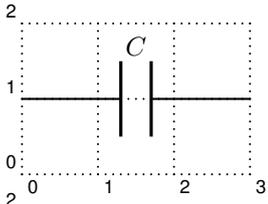
```
\pnode(0,1){A}
\pnode(3,1){B}
\capacitor(A)(B){$C$}
```
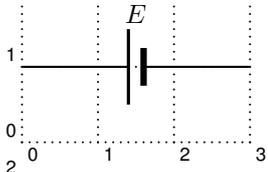
```
\pnode(0,1){A}
\pnode(3,1){B}
\battery(A)(B){$E$}
```
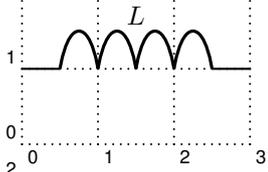
```
\pnode(0,1){A}
\pnode(3,1){B}
\coil(A)(B){$L$}
```
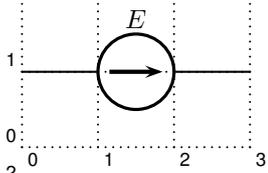
```
\pnode(0,1){A}
\pnode(3,1){B}
\Ucc(A)(B){$E$}
```
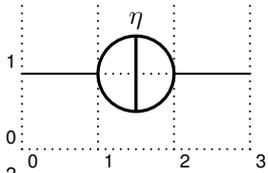
```
\pnode(0,1){A}
\pnode(3,1){B}
\Icc(A)(B){$\eta$}
```
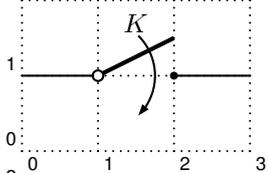
```
\pnode(0,1){A}
\pnode(3,1){B}
\switch(A)(B){$K$}
```
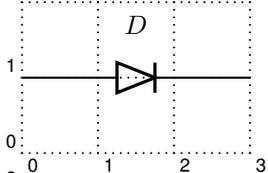
```
\pnode(0,1){A}
\pnode(3,1){B}
\diode(A)(B){$D$}
```
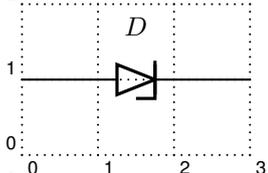
```
\pnode(0,1){A}
\pnode(3,1){B}
\Zener(A)(B){$D$}
```
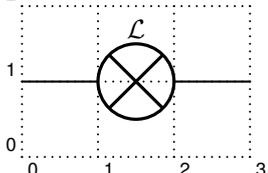
```
\pnode(0,1){A}
\pnode(3,1){B}
\lamp(A)(B){$\mathcal L$}
```
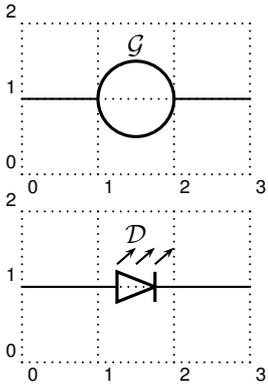
```
\pnode(0,1){A}
\pnode(3,1){B}
\circledipole(A)(B){$\mathcal G$}
```
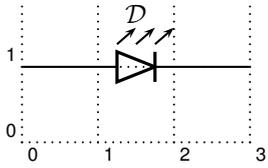
```
\pnode(0,1){A}
\pnode(3,1){B}
\LED(A)(B){$\mathcal D$}
```

3.2 Tripole macros

Obviously, tripoles are not node connections. So **'pst-circ'** tries its best to adjust the position of the tripole regarding the three nodes. Internally, the connections are done by the `\ncangle` pst-node macro. However, the auto-positionning and the auto-connections are not always well chosen[1], so don't try to use tripole macros in strange situations!
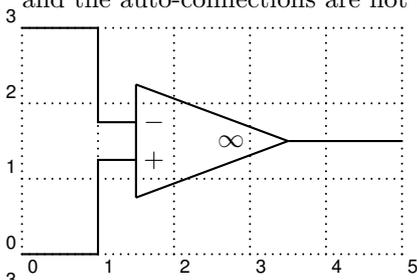
```
\pnode(0,0){A}
\pnode(0,3){B}
\pnode(5,1.5){C}
\OA(B)(A)(C)
```
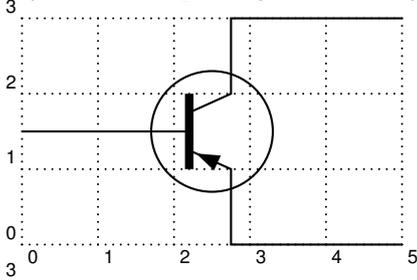
```
\pnode(0,1.5){A}
\pnode(5,3){B}
\pnode(5,0){C}
\transistor(A)(B)(C)
```
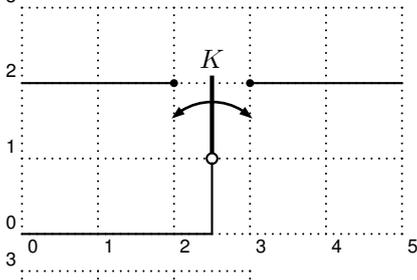
```
\pnode(0,2){A}
\pnode(5,2){B}
\pnode(0,0){C}
\Tswitch(A)(B)(C){$K$}
```
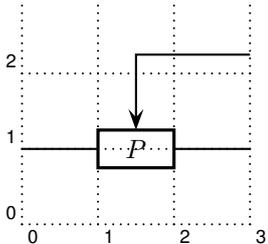
```
\pnode(0,1){A}
\pnode(3,1){B}
\pnode(3,2.25){C}
\potentiometer[labeloffset=0pt](A)(B)(C){$P$}
```

---

[1]This is something we are working on. I think that auto-positionning and auto-connections should be done at PostScript level and not at PSTricks level. If someone has any ideas, please mail us.

3.3   Quadrupole macros
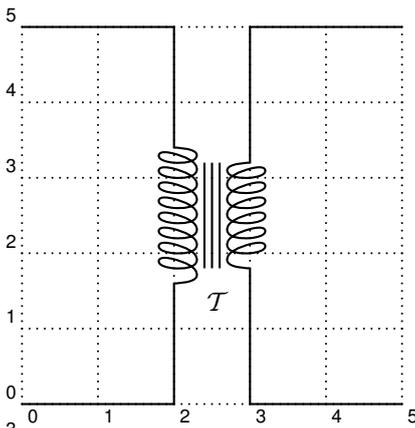
```
\pnode(0,5){A}
\pnode(0,0){B}
\pnode(5,5){C}
\pnode(5,0){D}
\transformer(A)(B)(C)(D){$\mathcal T$}
```
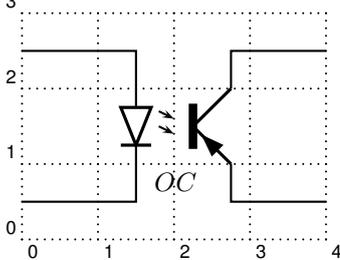
```
\pnode(0,2.5){A}
\pnode(0,0.5){B}
\pnode(4,2.5){C}
\pnode(4,0.5){D}
\optoCoupler(A)(B)(C)(D){$OC$}
```

3.4   Multidipole

\multidipole is a macro that allows multiple dipoles to be drawn between two specified nodes. \multidipole takes as many arguments as you want. **Note the dot that is after the last dipole.**
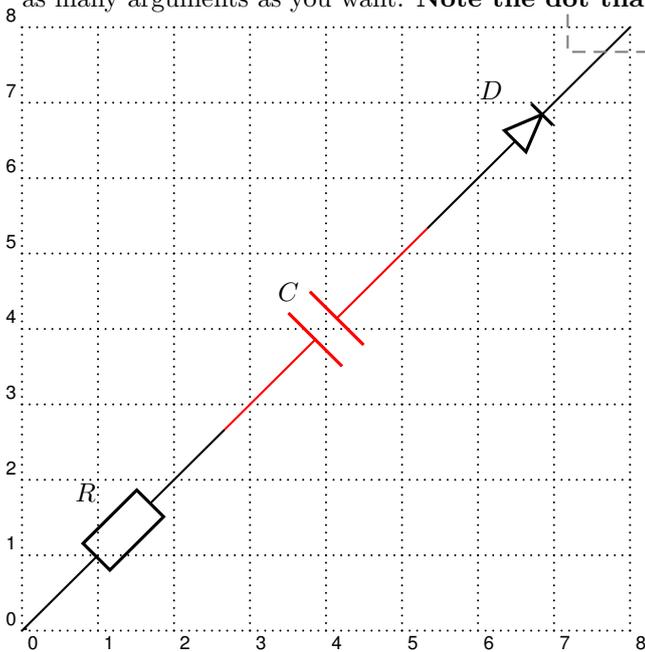
```
\pnode(0,0){A}
\pnode(8,8){B}
\multidipole(A)(B)\resistor{$R$}%
  \capacitor[linecolor=red]{$C$}%
  \diode{$D$}.
```

Important: for the time being, \multidipole takes optional arguments but does not restore original values. We recommand not using it.

3.5   Wire
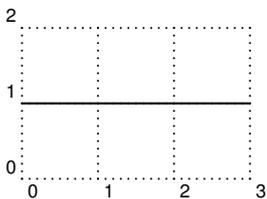
```
\pnode(0,1){A}
\pnode(3,1){B}
\wire(A)(B)
```

3.6   Potential
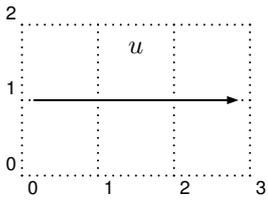
```
\pnode(0,1){A}
\pnode(3,1){B}
\tension(A)(B){$u$}
```

3.7   ground
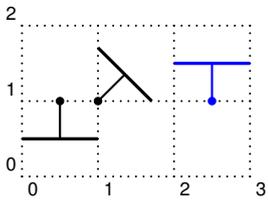
```
\pnode(0.5,1){A}
\pnode(1,1){B}
\pnode(2.5,1){C}
\ground(A)
\ground{135}(B)
\ground[linecolor=blue]{180}(C)
```

4   Parameters

4.1   Label parameters
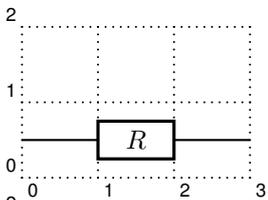
```
\pnode(0,.5){A}
\pnode(3,.5){B}
\resistor[labeloffset=0](A)(B){$R$}
```
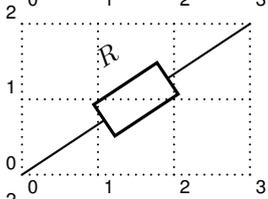
```
\pnode(0,0){A}
\pnode(3,2){B}
\resistor[labelangle=:U](A)(B){$R$}
```
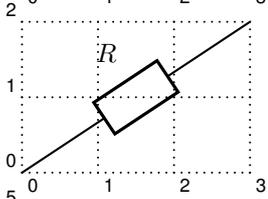
```
\pnode(0,0){A}
\pnode(3,2){B}
\resistor[labelangle=0](A)(B){$R$}
```
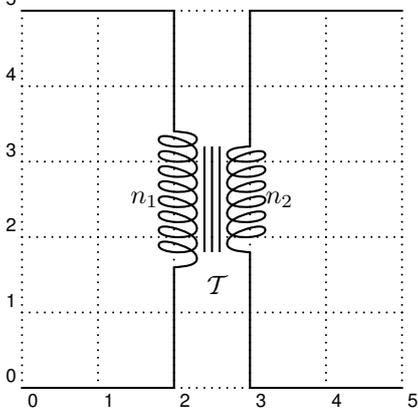
```
\pnode(0,5){A}
\pnode(0,0){B}
\pnode(5,5){C}
\pnode(5,0){D}
\transformer[primarylabel=$n_1$,
  secondarylabel=$n_2$](A)(B)(C)(D){$\mathcal T$}
```

4.2   Current intensity and electrical potential parameters

If the intensity parameter is set to true, an arrow is drawn on the wire connecting one of the nodes to the dipole. If the tension parameter is set to true, an arrow is drawn parallel to the dipole.

The way those arrows are drawn is set by `dipoleconvention` and `directconvention` parameters. `dipoleconvention` can take two values : `generator` or `receptor`. `directconvention` is a boolean.
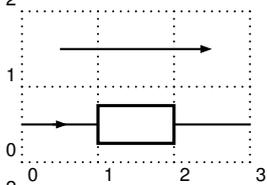
```
\pnode(0,.5){A}
\pnode(3,.5){B}
\resistor[intensity,tension](A)(B){}
```
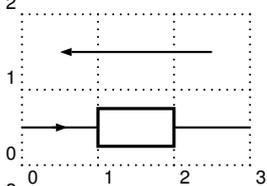
```
\pnode(0,.5){A}
\pnode(3,.5){B}
\resistor[intensity,tension,
    dipoleconvention=generator](A)(B){}
```
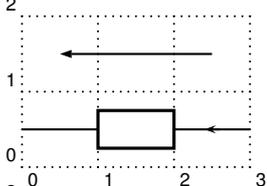
```
\pnode(0,.5){A}
\pnode(3,.5){B}
\resistor[intensity,tension,
    directconvention=false](A)(B){}
```
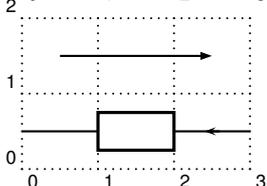
```
\pnode(0,.5){A}
\pnode(3,.5){B}
\resistor[intensity,tension,
    dipoleconvention=generator,directconvention=false](A)(B){}
```

If `intensitylabel` is set to an non empty argument, then `intensity` is automatically set to true. If `tensionlabel` is set to an non empty argument, then `tension` is automatically set to true.
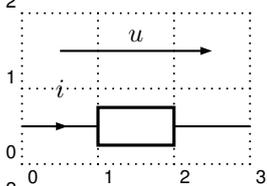
```
\pnode(0,.5){A}
\pnode(3,.5){B}
\resistor[intensitylabel=$i$,tensionlabel=$u$](A)(B){}
```
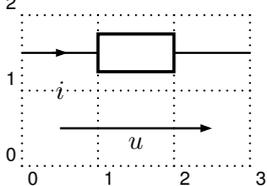
```
\pnode(0,1.5){A}
\pnode(3,1.5){B}
\resistor[intensitylabel=$i$,intensitylabeloffset=-0.5,
    tensionlabel=$u$,tensionlabeloffset=-1.2,
    tensionoffset=-1](A)(B){}
```
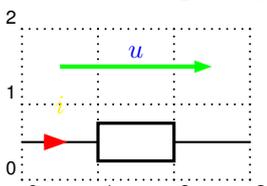
```
\pnode(0,.5){A}
\pnode(3,.5){B}
\resistor[intensitylabel=$i$,intensitywidth=3\pslinewidth,
    intensitycolor=red,intensitylabelcolor=yellow,
    tensionlabel=$u$,tensionwidth=2\pslinewidth,
    tensioncolor=green,tensionlabelcolor=blue](A)(B){}
```

Some specific intensity parameters are available for tripoles and quadrupoles.
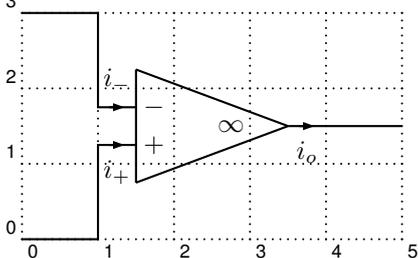
```
\pnode(0,0){A}
\pnode(0,3){B}
\pnode(5,1.5){C}
\OA[OAipluslabel=$i_+$,
    OAiminuslabel=$i_-$,
    OAioutlabel=$i_o$](B)(A)(C)
```
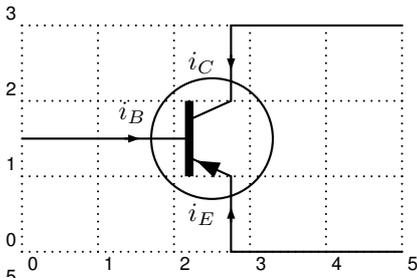
```
\pnode(0,1.5){A}
\pnode(5,3){B}
\pnode(5,0){C}
\transistor[transistoribaselabel=$i_B$,
    transistoricollectorlabel=$i_C$,
    transistoriemitterlabel=$i_E$](A)(B)(C)
```
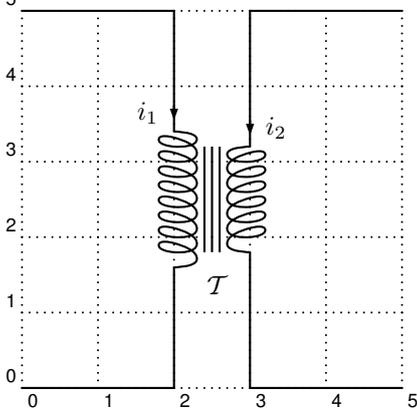
```
\pnode(0,5){A}
\pnode(0,0){B}
\pnode(5,5){C}
\pnode(5,0){D}
\transformer[transformeriprimarylabel=$i_1$,
    transformerisecondarylabel=$i_2$]%
    (A)(B)(C)(D){$\mathcal T$}
```

4.3   Parallel parameters

If the `parallel` parameter is set to `true`, the dipole is drawn parallel to the line connecting the nodes.

```
\pnode(0,.5){A}
\pnode(3,.5){B}
\resistor(A)(B){}
\resistor[parallel](A)(B){}
```
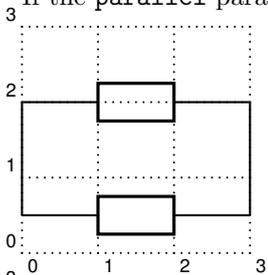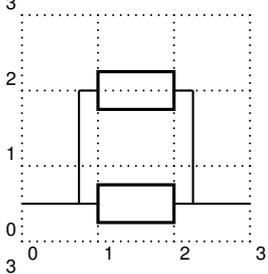
```
\pnode(0,.5){A}
\pnode(3,.5){B}
\resistor(A)(B){}
\resistor[parallel,parallelsep=.5](A)(B){}
```
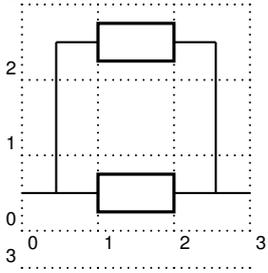
```
\pnode(0,.5){A}
\pnode(3,.5){B}
\resistor(A)(B){}
\resistor[parallel,parallelsep=.3,
    parallelarm=2](A)(B){}
```
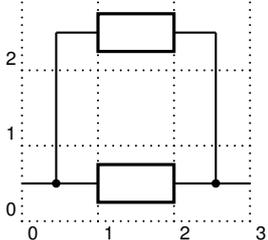
```
\pnode(0,.5){A}
\pnode(3,.5){B}
\resistor(A)(B){}
\resistor[parallel,parallelsep=.3,
    parallelarm=2,parallelnode](A)(B){}
```

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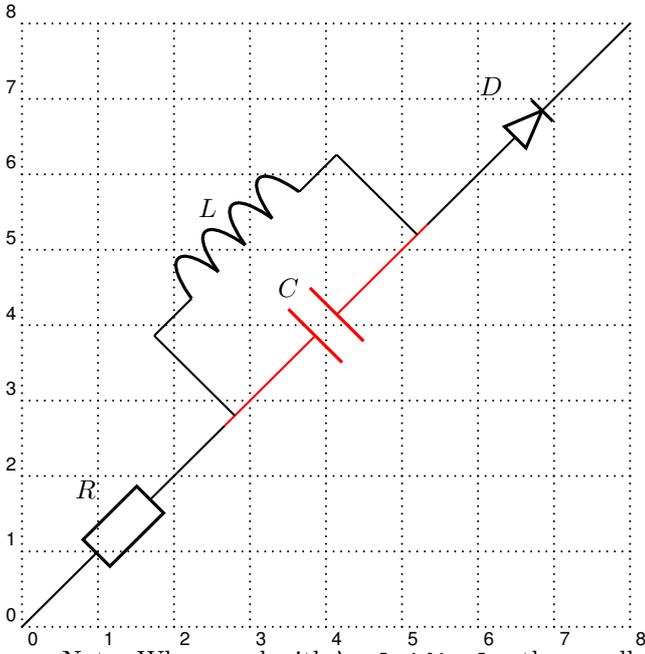
```
\pnode(0,0){A}
\pnode(8,8){B}
\multidipole(A)(B)\resistor{$R$}%
  \capacitor[linecolor=red]{$C$}%
  \coil[parallel,parallelsep=.1]{$L$}%
  \diode{$D$}.
```

Note: When used with \multidipole, the parallel `parameter` must not be set for the first dipole.

4.4   Wire intersections
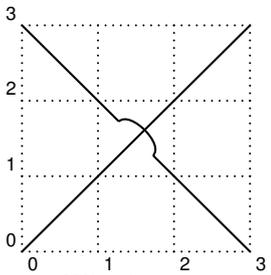

```
\pnode(0,0){A}
\pnode(3,3){B}
\pnode(0,3){C}
\pnode(3,0){D}
\wire(A)(B)
\wire[intersect,intersectA=A,intersectB=B](C)(D)
```

Wire intersect parameters work also with \multidipole.
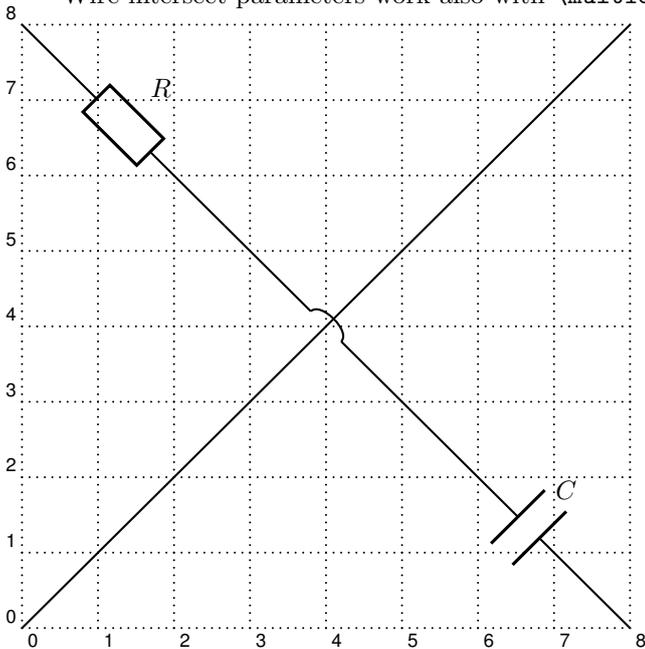

```
\pnode(0,0){A}
\pnode(8,8){B}
\pnode(0,8){C}
\pnode(8,0){D}
\wire(A)(B)
\multidipole(C)(D)\resistor{$R$}%
  \wire[intersect,intersectA=A,intersectB=B]%
  \capacitor{$C$}.
```

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4.5   Dipole style parameters
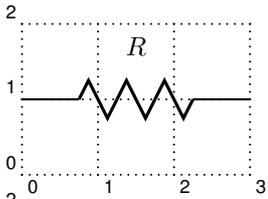
```
\pnode(0,1){A}
\pnode(3,1){B}
\resistor[dipolestyle=zigzag](A)(B){$R$}
```
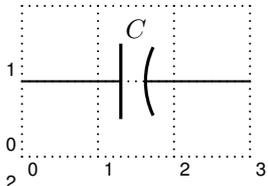
```
\pnode(0,1){A}
\pnode(3,1){B}
\capacitor[dipolestyle=chemical](A)(B){$C$}
```
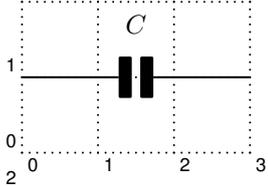
```
\pnode(0,1){A}
\pnode(3,1){B}
\capacitor[dipolestyle=elektor](A)(B){$C$}
```
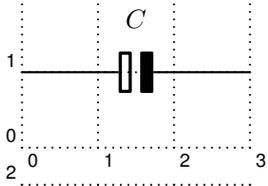
```
\pnode(0,1){A}
\pnode(3,1){B}
\capacitor[dipolestyle=elektorchemical](A)(B){$C$}
```
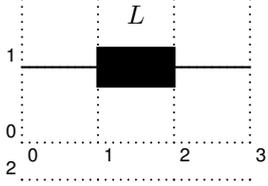
```
\pnode(0,1){A}
\pnode(3,1){B}
\coil[dipolestyle=rectangle](A)(B){$L$}
```
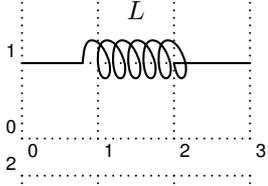
```
\pnode(0,1){A}
\pnode(3,1){B}
\coil[dipolestyle=curved](A)(B){$L$}
```
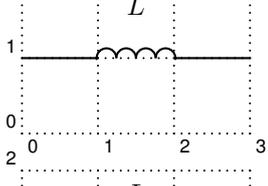
```
\pnode(0,1){A}
\pnode(3,1){B}
\coil[dipolestyle=elektor](A)(B){$L$}
```
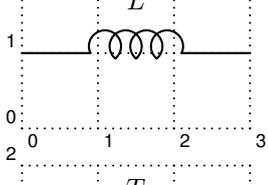
```
\pnode(0,1){A}
\pnode(3,1){B}
\coil[dipolestyle=elektorcurved](A)(B){$L$}
```
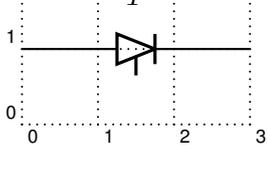
```
\pnode(0,1){A}
\pnode(3,1){B}
\diode[dipolestyle=thyristor](A)(B){$T$}
```
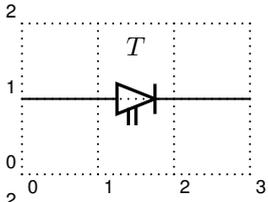
```
\pnode(0,1){A}
\pnode(3,1){B}
\diode[dipolestyle=GTO](A)(B){$T$}
```
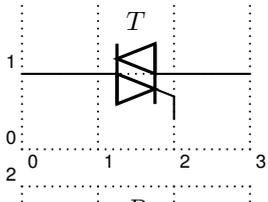
```
\pnode(0,1){A}
\pnode(3,1){B}
\diode[dipolestyle=triac](A)(B){$T$}
```
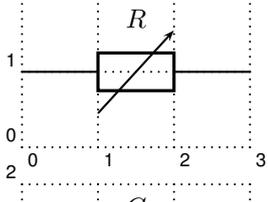
```
\pnode(0,1){A}
\pnode(3,1){B}
\resistor[variable](A)(B){$R$}
```
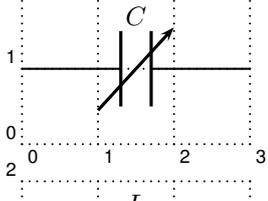
```
\pnode(0,1){A}
\pnode(3,1){B}
\capacitor[variable](A)(B){$C$}
```
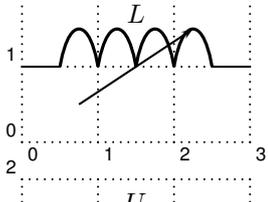
```
\pnode(0,1){A}
\pnode(3,1){B}
\coil[variable](A)(B){$L$}
```
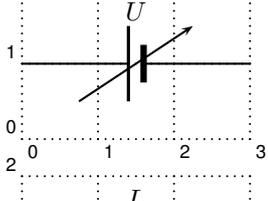
```
\pnode(0,1){A}
\pnode(3,1){B}
\battery[variable](A)(B){$U$}
```
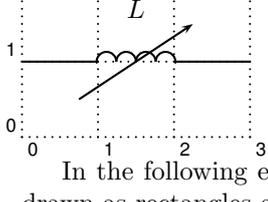
```
\pnode(0,1){A}
\pnode(3,1){B}
\coil[dipolestyle=elektor,variable](A)(B){$L$}
```

In the following example the parameter `dipolestyle` is used for a tripole and quadrupole, because the coils are drawn as rectangles and the resistor as a zigzag.
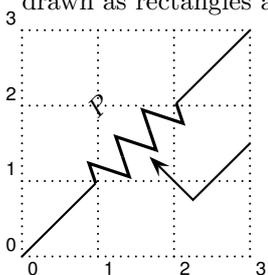
```
\pnode(0,0){A}
\pnode(3,3){B}
\pnode(3,1.5){C}
\potentiometer[,dipolestyle=zigzag,%
  labelangle=:U](A)(B)(C){$P$}
```
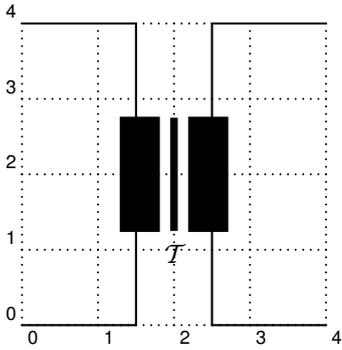
```
\pnode(0,4){A}
\pnode(0,0){B}
\pnode(4,4){C}
\pnode(4,0){D}
\transformer[dipolestyle=rectangle](A)(B)(C)(D){$\mathcal T$}
```

4.6 Tripole style parameters
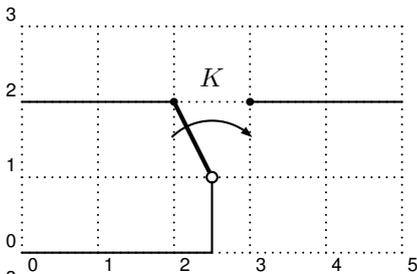
```
\pnode(0,2){A}
\pnode(5,2){B}
\pnode(0,0){C}
\Tswitch[tripolestyle=left](A)(B)(C){$K$}
```
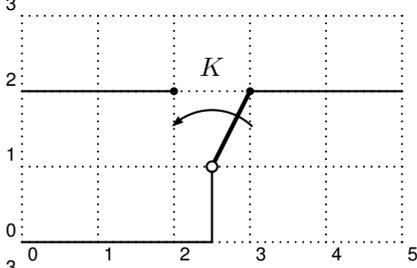
```
\pnode(0,2){A}
\pnode(5,2){B}
\pnode(0,0){C}
\Tswitch[tripolestyle=right](A)(B)(C){$K$}
```
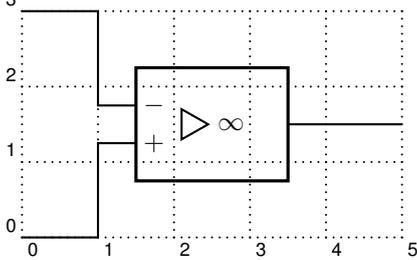
```
\pnode(0,3){A}
\pnode(0,0){B}
\pnode(5,1.5){C}
\OA[tripolestyle=french](A)(B)(C)
```

4.7 Other Parameters
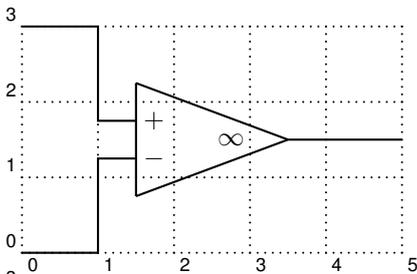
```
\pnode(0,0){A}
\pnode(0,3){B}
\pnode(5,1.5){C}
\OA[OAinvert=false](B)(A)(C)
```
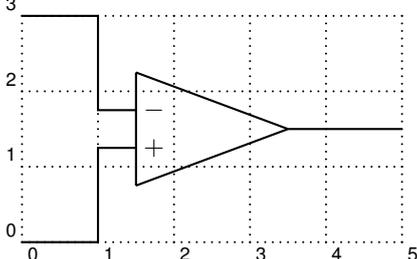
```
\pnode(0,0){A}
\pnode(0,3){B}
\pnode(5,1.5){C}
\OA[OAperfect=false](B)(A)(C)
```
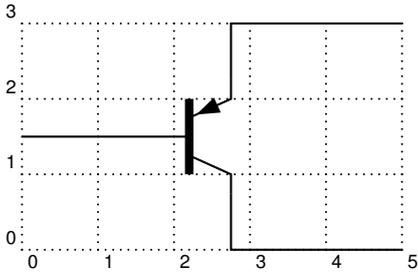
```
\pnode(0,1.5){A}
\pnode(5,3){B}
\pnode(5,0){C}
\transistor[transistorinvert,transistorcircle=false](A)(B)(C)
```

5   Examples
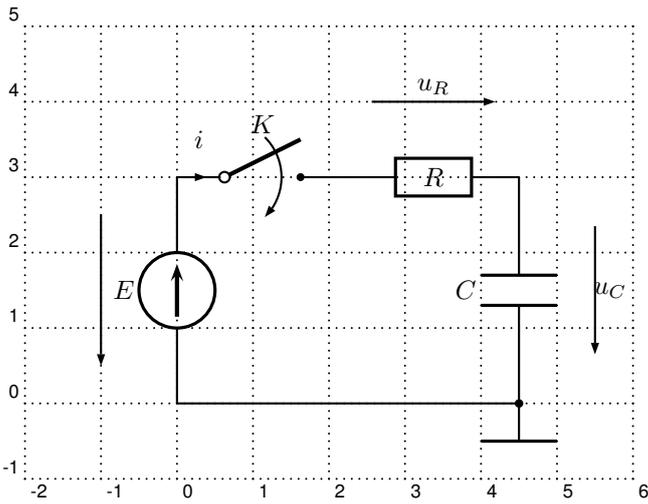
```
\begin{pspicture}(-1.5,-1)(6,5)
\psgrid[subgriddiv=1,griddots=10]
% Node definitions
\pnode(0,0){A}
\pnode(0,3){B}
\pnode(4.5,3){C}
\pnode(4.5,0){D}
% Dipole node connection
\Ucc[tension,dipoleconvention=generator](A)(B){$E$}
\multidipole(B)(C)%
  \switch[intensitylabel=$i$]{$K$}%
  \resistor[labeloffset=0,tensionlabel=$u_R$]{$R$}.
\capacitor[tensionlabel={$u_C$},
  tensionlabeloffset=-1.2,tensionoffset=-1,
  directconvention=false](D)(C){$C$}
% Wire to complete circuit
\wire(A)(D)
% Ground
\ground(D)
\end{pspicture}
```
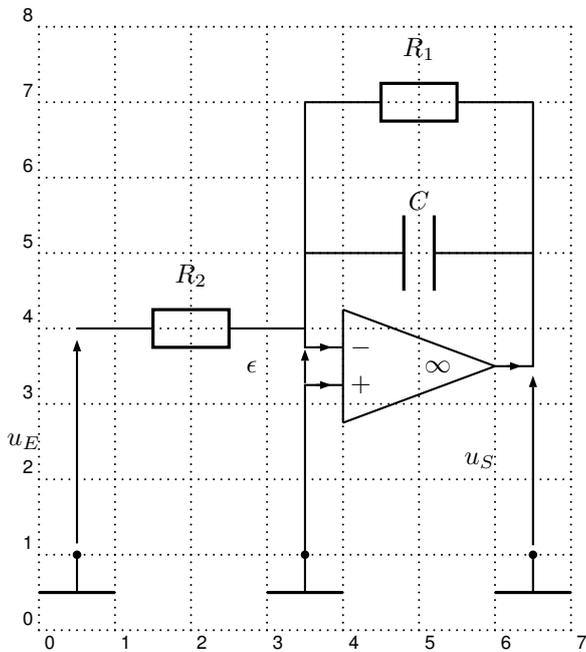
```
\begin{pspicture}(-0.5,0)(7,8)
\psgrid[subgriddiv=1,griddots=10]
% Node definitions
\pnode(0.5,1){A}
\pnode(3.5,1){B}
\pnode(6.5,1){C}
\pnode(0.5,4){D}
\pnode(3.5,4){Minus}
\pnode(3.5,3){Plus}
\pnode(6.5,5){S}
\pnode(3.5,5){E}
% Dipole node connections
\resistor(D)(Minus){$R_2$}
\capacitor(E)(S){$C$}
\resistor[parallel,parallelarm=2](E)(S){$R_1$}
\OA[intensity](Minus)(Plus)(S)
% Wires
\wire(Minus)(E)
\wire(Plus)(B)
% Tensions
\tension(A)(D){$u_E$}
\makeatletter % (special tricks see below)
\tension(C)(S@@){$u_S$}
\tension[linecolor=blue](Plus@@)(Minus@@){$\epsilon$}
\makeatother
% Grounds
\ground(A)
\ground(B)
\ground(C)
\end{pspicture}
```
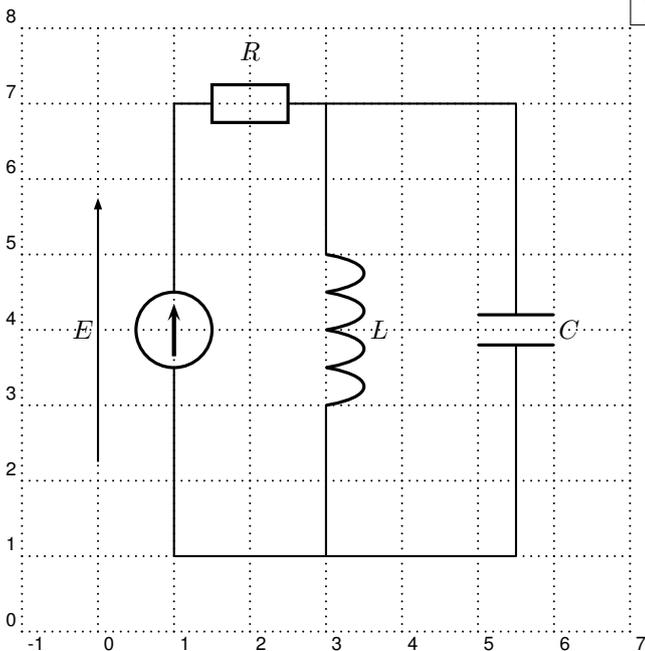


```
\begin{pspicture}(-1,0)(7,8)
\psgrid[subgriddiv=1,griddots=10]
% Node definitions
\pnode(1,1){A}
\pnode(1,7){B}
\pnode(3,1){C}
\pnode(3,7){D}
% Dipole node connections
\Ucc[tensionlabel=$E$](A)(B){}
\resistor(B)(D){$R$}
\coil(D)(C){$L$}
\capacitor[parallel,parallelarm=2.5](D)(C){$C$}
% Wire
\wire(A)(C)
\end{pspicture}
```

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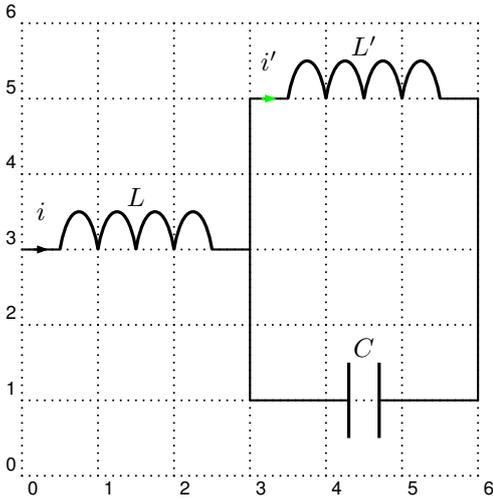
```
\begin{pspicture}(6,6)
\psgrid[subgriddiv=1,griddots=10]
% Node definitions
\pnode(0,3){A}
\pnode(3,3){B}
\pnode(6,3){C}
% Dipole node connections
\coil[intensitylabel=$i$](A)(B){$L$}
\coil[intensitylabel=$i'$,intensitycolor=green,%
  parallel,parallelarm=2](B)(C){$L'$}
\capacitor[parallel,parallelarm=-2](B)(C){$C$}
\end{pspicture}
```
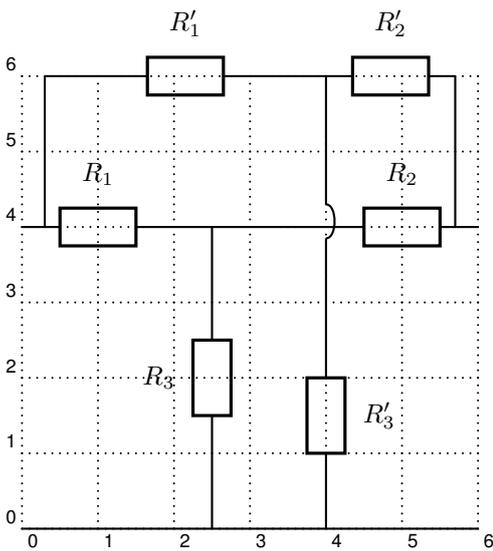
```
\begin{pspicture}(6,6)
\psgrid[subgriddiv=1,griddots=10]
% Node definitions
\pnode(0,0){A}\pnode(6,0){B}
\pnode(0.3,4){Cprime}\pnode(5.7,4){Dprime}
\pnode(2.5,4){Gprime}\pnode(2.5,0){Hprime}
\pnode(0,4){C}\pnode(6,4){D}
\pnode(0.3,6){E}\pnode(5.7,6){F}
\pnode(4,6){G}\pnode(4,0){H}
\multidipole(G)(H)%
  \wire[intersect,
    intersectA=C,intersectB=D]
  \resistor{$R'_3$}.
\resistor(E)(G){$R'_1$}
\resistor(G)(F){$R'_2$}
\multidipole(C)(D)\resistor{$R_1$}%
  \wire\resistor{$R_2$}.
\wire(A)(B)\wire(Cprime)(E)
\wire(Dprime)(F)
\resistor(Hprime)(Gprime){$R_3$}
\end{pspicture}
```

```
\begin{pspicture}(9,11)
\psgrid[subgriddiv=1,griddots=10]
% Node definitions
\pnode(0,0){A}
\pnode(9,0){B}
\pnode(0,6){C}
\pnode(9,6){D}
\pnode(4.5,1){E}
\pnode(4.5,10.5){F}
%
\switch(A)(C){$K$}
\multidipole(A)(B)\resistor{$R$}%
  \battery[intensitylabel=$i$]{$V$}.
\wire(B)(D)
\multidipole(C)(D)\diode{$D$}\wire.
\resistor[tensionlabel=$U_1$](C)(F){$R_1$}
\resistor(C)(E){$R_4$}
\capacitor[parallel,parallelarm=1.2,
  parallelsep=1.5](C)(E){$C_2$}
\coil(E)(D){$L$}
\capacitor[parallel,parallelarm=1.2,
  parallelsep=1.5](E)(D){$C_3$}
\capacitor[tensionlabel=$U_2$](F)(D){$C_1$}
\multidipole(E)(F)\wire%
  \wire[intersect,
  intersectA=C,intersectB=D]%
  \circledipole[labeloffset=-0.7]{$E$}%
  \resistor[parallel,
    parallelsep=.6,parallelarm=.8]{$R$}.
\end{pspicture}
```

```
\begin{pspicture}(13,8)
  \psset{intensitycolor=red,intensitylabelcolor=red,%
      tensioncolor=green,tensionlabelcolor=green,%
      intensitywidth=3pt}
  \psgrid[griddots=5,gridlabels=7pt,subgriddiv=0]
  \circledipole[
      tension,%
      tensionlabel=$U_0$,%
      tensionoffset=0.75,%
      labeloffset=0](0,0)(0,6){\LARGE\textbf{=}}
  \wire[intensity,intensitylabel=$i_0$](0,6)(2.5,6)
  \diode[dipolestyle=thyristor](2.5,6)(4.5,6){$T_1$}
  \wire[intensity,intensitylabel=$i_1$](4.5,6)(6.5,6)
  \multidipole(6.5,7.5)(2.5,7.5)%
      \coil[dipolestyle=rectangle,labeloffset=-0.75]{$L_5$}%
      \diode[labeloffset=-0.75]{$D_5$}.
  \wire[intensity,intensitylabel=$i_5$](6.5,6)(6.5,7.5)
  \wire(2.5,7.5)(2.5,3)
  \wire[intensity,intensitylabel=$i_c$](2.5,4.5)(2.5,6)
  \qdisk(2.5,6){2pt}\qdisk(6.5,6){2pt}
  \diode[dipolestyle=thyristor](2.5,4.5)(4.5,4.5){$T_2$}
  \wire[intensity,intensitylabel=$i_2$](4.5,4.5)(6.5,4.5)
  \capacitor[tension,tensionlabel=$u_c$,%
      tensionoffset=-0.75,tensionlabeloffset=-1](6.5,4.5)(6.5,6){$C_k$}
  \qdisk(2.5,4.5){2pt}\qdisk(6.5,4.5){2pt}
  \wire[intensity,intensitylabel=$i_3$](6.5,4.5)(6.5,3)
```

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```
   \multidipole(6.5,3)(2.5,3)%
        \coil[dipolestyle=rectangle,labeloffset=-0.75]{$L_3$}%
        \diode[labeloffset=-0.75]{$D_3$}.
   \wire(6.5,6)(9,6)\qdisk(9,6){2pt}
   \diode(9,0)(9,6){$D_4$}
   \wire[intensity,intensitylabel=$i_4$](9,3.25)(9,6)
   \wire[intensity,intensitylabel=$i_a$](9,6)(11,6)
   \multidipole(11,6)(11,0)%
        \resistor{$R_L$}
        \coil[dipolestyle=rectangle]{$L_L$}%
   \circledipole[labeloffset=0,%
           tension,tensionoffset=0.7,%
           tensionlabel=$U_B$]{\LARGE\textbf{=}}.
   \wire(0,0)(11,0)\qdisk(9,0){2pt}
   \pnode(12.5,5.5){A}\pnode(12.5,0.5){B}
   \tension(A)(B){$u_a$}
\end{pspicture}
```
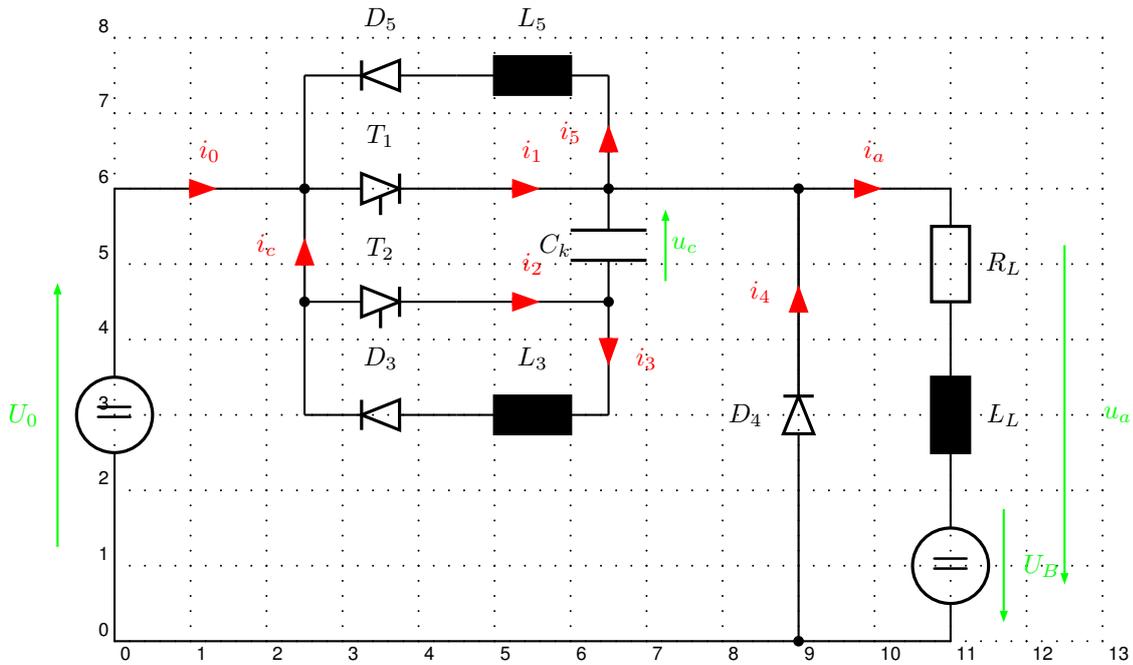

The fellowing example was written by Manuel Luque.

```
\begin{pspicture}(14,4)
\psgrid[subgriddiv=1,griddots=10]
\pnode(0,0){B}\pnode(0,3){A}
\pnode(2.5,3.5){C}\pnode(2.5,-0.5){D}
\pnode(5,3){E}\pnode(6.5,1.5){F}
\pnode(5,0){G}\pnode(3.5,1.5){H}
\pnode(8,2.5){I}\pnode(8,1){J}
\pnode(10,2.5){K}\pnode(10,1){L}
\pnode(14,2.5){M}\pnode(12,1){N}
\pnode(3,1){H'}\pnode(14,2.5){O}
\pnode(14,1){P}\pnode(13.5,1){Q}
\transformer[transformeriprimarylabel=$i_1$,
  transformerisecondarylabel=$i_2$,
  primarylabel=$n_1$,secondarylabel=$n_2$]%
  (A)(B)(C)(D){$T_1$}
{\psset{fillstyle=solid,fillcolor=black}
```

```
\diode(H)(E){}\diode(H)(G){}
\diode(E)(F){}\diode(G)(F){}}
\capacitor[dipolestyle=chemical](I)(J){}
\capacitor(K)(L){}
\REG(K)(M)(N)%
  {\shortstack{\textsf{%
  \textbf{\large LM7805}}\\\textbf{+5V}}}
\ncangle{I}{F}\psline(I)(K)
\ncangle{E}{C}\ncangle{G}{D}
\ncangle[arm=0]{P}{Q}
\ncangle[arm=0]{H}{H'}
\ground(H')\ground(J)
\ground(L)\ground(N)
\ground(Q)\qdisk(I){1.5pt}
\qdisk(K){1.5pt}\qdisk(E){1.5pt}
\qdisk(G){1.5pt}\qdisk(H){1.5pt}
\qdisk(F){1.5pt}
\pscircle[fillstyle=solid](A){0.075}
\pscircle[fillstyle=solid](B){0.075}
\pscircle[fillstyle=solid](P){0.075}
\pscircle[fillstyle=solid](O){0.075}
\end{pspicture}
```
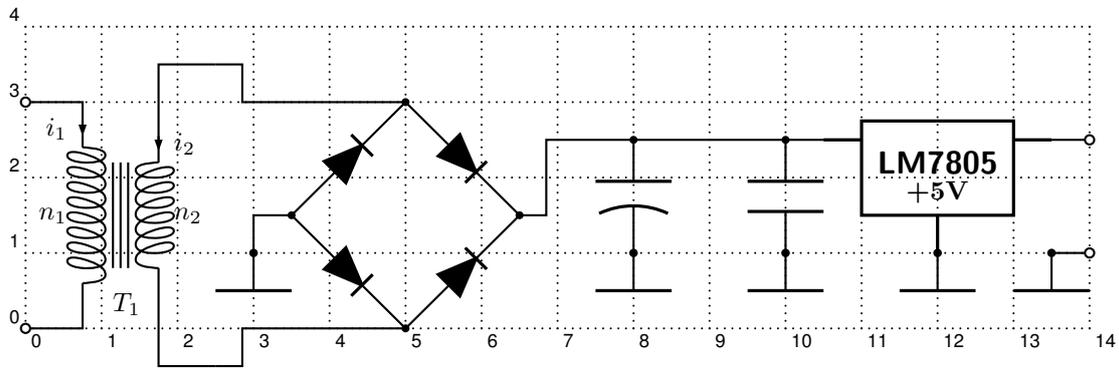

The fellowing example was written by Lionel Cordesses.

```
\begin{pspicture}(11,3)
\psset{dipolestyle=elektor}
\pnode(1,2){Vin}\pnode(0.5,2){S}\pnode(0.5,0){Sm}
\pnode(2.5,2){A}\pnode(4.5,2){B}\pnode(6.5,2){C}
\pnode(8,2){Cd}\pnode(8.5,2){D}\pnode(9.5,2){E}
\pnode(2.5,0){Am}\pnode(4.5,0){Bm}\pnode(6.5,0){Cm}
\pnode(8.5,0){Dm}\pnode(9.5,0){Em}
\Ucc[labeloffset=0.9](Sm)(S){$V_{in}$}\resistor(Vin)(A){$R$}
\capacitor(A)(Am){$C_1$} \capacitor(B)(Bm){$C_3$}
\capacitor[labeloffset=-0.7](D)(Dm){$C_n$}\resistor(E)(Em){$R$}
\coil(A)(B){$L_2$}\coil(B)(C){$L_4$}
\wire(Am)(Bm)\wire(Bm)(Cm)\wire(Cm)(Dm)\wire(Dm)(Em)\wire(D)(E)
\wire(Cd)(D)\psline[linestyle=dashed](C)(Cd)
\wire(S)(Vin)\wire(Sm)(Am)
\pscircle*(D){2\pslinewidth} \pscircle*(Dm){2\pslinewidth}
\pscircle*(A){2\pslinewidth} \pscircle*(Am){2\pslinewidth}
\pscircle*(B){2\pslinewidth} \pscircle*(Bm){2\pslinewidth}
\end{pspicture}
```
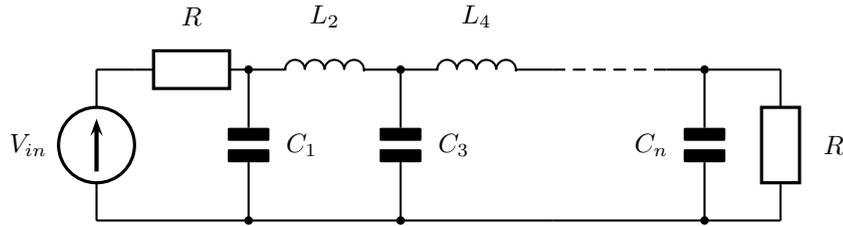
6   Adding new components

Adding new components is not simple. As a matter of fact, because of the complex mechanism of `\multidipole`, there are multiple steps. The easiest way to proceed is to draw the component, send it to me (christophe.jorssen@noos.fr) and I'll do the programming work regarding your component. Nevertheless, it can take some time...

If you want to modify the code, you need to know the following things. For a dipole, you first need to define the following items

```
\def\component_name{\@ifnextchar[{\pst@component_name}{\pst@component_name[]}}
%
\def\pst@component_name[#1](#2)(#3)#4{{%
  \pst@draw@dipole{#1}{#2}{#3}{#4}\pst@draw@component_name
  }\ignorespaces}
%
\def\pst@multidipole@component_name{\@ifnextchar[{\pst@multidipole@component_name@}%
  {\pst@multidipole@component_name@[]}}
%
\def\pst@multidipole@component_name@[#1]#2{%
  \expandafter\def\csname pst@circ@tmp@\number\pst@circ@count@iii\endcsname{#2}%
  {\setkeys{psset}{#1}%
  \ifPst@circ@parallel\aftergroup\advance\aftergroup\pst@circ@count@i\aftergroup\m@ne\fi}%
  \pst@circ@count@ii=\pst@circ@count@i%
  \advance\pst@circ@count@ii\@ne%
  \toks0\expandafter{\pst@multidipole@output}%
  \edef\pst@multidipole@output{%
    \the\toks0%
    \pst@multidipole@def@coor%
    \noexpand\component_name[#1]%
  (! X@\the\pst@circ@count@i\space Y@\the\pst@circ@count@i)%
  (! X@\the\pst@circ@count@ii\space Y@\the\pst@circ@count@ii)%
      {\noexpand\csname pst@circ@tmp@\number\pst@circ@count@iii\endcsname}%
  }%
  \pst@multidipole@
}
%
\def\pst@draw@component_name{%
  % The PSTricks code for your component
  % The center of the component is at (0,0)
  \pnode(component_left_end,0){dipole@1}
  \pnode(component_right_end,0){dipole@2}
}
```

Then, you have to make some changes in the `\multidipole` core code... In the definition of `\pst@multidipole`, look for the last `\ifx` test

```
% ...
% Extract from \pst@multidipole
                \else
```

```
                            \ifx\circledipole #4%
                              \let\next\pst@multidipole@circledipole
                            \else
                              \ifx\LED #4%
                                \let\next\pst@multidipole@LED
                              \else
                              % Put your modification here
                                \let\next\ignorespaces
                              \fi
                            \fi
                          \fi
% Extract form \pst@multidipole
% ...
```

and add (in red)

```
% ...
% Extract from \pst@multidipole
                          \else
                            \ifx\circledipole #4%
                              \let\next\pst@multidipole@circledipole
                            \else
                              \ifx\LED #4%
                                \let\next\pst@multidipole@LED
                              \else
                                \ifx\component_name #4%
                                  \let\next\pst@multidipole@component_name
                                \else
                                  \let\next\ignorespaces
                                \fi
                              \fi
                            \fi
                          \fi
% Extract form \pst@multidipole
% ...
```

Do the same in `\pst@multidipole@`

```
% ...
% Extract from \pst@multidipole@
                          \else
                            \ifx\circledipole #1%
                              \let\next\pst@multidipole@circledipole
                            \else
                              \ifx\LED #1%
                                \let\next\pst@multidipole@LED
                              \else
                                \ifx\component_name #1%
                                  \let\next\pst@multidipole@component_name
                                \else
                                  \let\next\ignorespaces
                                  \pst@multidipole@output
                                \fi
                              \fi
                            \fi
                          \fi
% Extract form \pst@multidipole@
% ...
```

and that's it! All you have to do then is send your modified `pst-circ.tex` to me and it will become part of the official release of **'pst-circ'**.

Important: Pay attention to the comment character `%` at the end of lines. They are *very* important in order to avoid spurious blanks.

7   Acknowledgements

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