

circuitikz-dutch

Drawing Electric Circuits in Dutch Textbooks

Jesse op den Brouw*

June 27, 2022

This package sets up CircuiTikZ to draw electric circuits with the conventions used in Dutch textbooks. After loading the `circuitikz` package, a number of patches will be applied to CircuiTikZ commands.

License and warranty

This work may be distributed and/or modified under the conditions of the \LaTeX Project Public License, either version 1.3 of this license or (at your option) any later version. The latest version of this license is in <http://www.latex-project.org/lppl.txt> and version 1.3 or later is part of all distributions of \LaTeX version 2003/12/01 or later.

This work has the LPPL maintenance status “author-maintained”.

This work consists of the files `circuitikz-dutch.sty` and `circuitikz-dutch-doc.tex`

This software is provided ‘as is’, without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Package loading

Load the package by:

```
1 \usepackage{circuitikz-dutch}
```

The package has no options. CircuiTikZ will be loaded by this package. Please **do not** (re)load CircuiTikZ after this package.

The symbols

The symbols for voltage source, current source, resistor, capacitor and inductor are shown in Figure 1.

*Version 0.2, The Hague University of Applied Sciences, J.E.J.opdenBrouw@hhs.nl

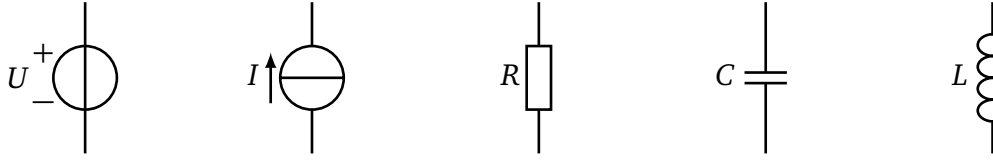


Figure 1: Dutch symbols for voltage source, current source, resistor, capacitor and inductor.

The CircuiTikZ code to produce these symbols is shown below:

```

1 \begin{circuitikz}
2 \draw (0,0) to[V=$U$] ++(0,2);           % independent voltage source
3 \draw (2,0) to[I,label=$I$] ++(0,2);     % independent current source
4 \draw (4,0) to[R=$R$] ++(0,2);           % resistor
5 \draw (6,0) to[C=$C$] ++(0,2);           % capacitor
6 \draw (8,0) to[L=$L$] ++(0,2);           % inductor
7 \end{circuitikz}

```

Note: due to the present current drawing strategy, it's mandatory that you use a label when specifying the source's current. See Figure 2 below for the differences.

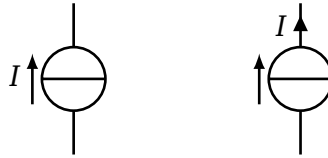


Figure 2: Differences in drawing current sources.

The CircuiTikZ code to produce these symbols is shown below:

```

1 \begin{circuitikz}
2 \draw (3,0) to[I,label=$I$] ++(0,2);
3 \draw (6,0) to[I=$I$] ++(0,2);
4 \end{circuitikz}

```

In Figure 3, the dependent voltage and current sources are shown:

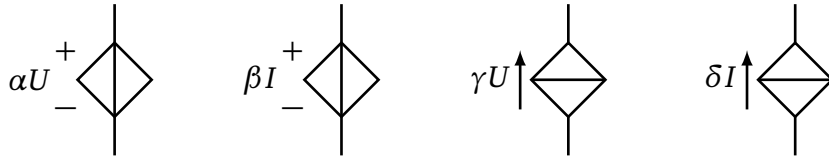


Figure 3: Symbols for dependant sources.

The code is shown below:

```

1 \begin{circuitikz}
2 \draw (0,0) to[cvsource=$\alpha U$] ++(0,2);
3 \draw (3,0) to[cvsource=$\beta I$] ++(0,2);
4 \draw (6,0) to[cisource,label=$\gamma U$] ++(0,2);

```

```

5 \draw (9,0) to[cisource,label=\delta I\$] ++(0,2);
6 \end{circuitikz}

```

Sinusiodal sources are shown below:

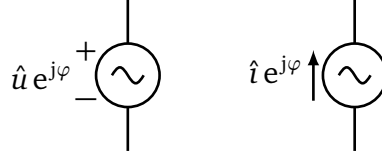


Figure 4: Symbols for sinusiodal sources.

Code to produce these symbols:

```

1 \begin{circuitikz}
2 \draw (0,0) to[sV=\hat{u}\,,\mathrm{e}^{\,,\mathrm{j}}\mathrm{varphi}\$] ++(0,2);
3 \draw (3,0)
   to[sI,label=\hat{\imath}\,,\mathrm{e}^{\,,\mathrm{j}}\mathrm{varphi}\$]
   ++(0,2);
4 \end{circuitikz}

```

Batteries are shown in Figure 5.

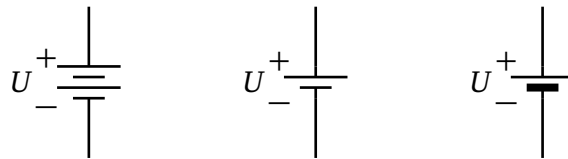


Figure 5: Symbols for batteries.

Code to produce these symbols:

```

1 \begin{circuitikz}
2 \draw (3,0) to[battery=$U$,invert] ++(0,2);
3 \draw (6,0) to[battery1=$U$,invert] ++(0,2);
4 \draw (9,0) to[battery2=$U$,invert] ++(0,2);
5 \end{circuitikz}

```

Voltages across components are displayed with ‘+’ and ‘−’, as shown in Figure 6.

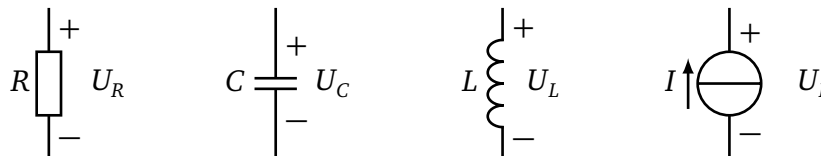


Figure 6: Symbols with voltages.

The code to produce the symbols is shown below:

```

1 \begin{circuitikz}
2 \draw (0,0) to[R=$R$, v<=$U_R$] ++(0,2);
3 \draw (3,0) to[C=$C$, v<=$U_C$] ++(0,2);
4 \draw (6,0) to[L=$L$, v<=$U_L$] ++(0,2);
5 \draw (9,0) to[I,label=$I$, v=$U_I$] ++(0,2);
6 \end{circuitikz}

```

Displaying values and units

You can use the `siunitx` package to put values and units to the symbols:

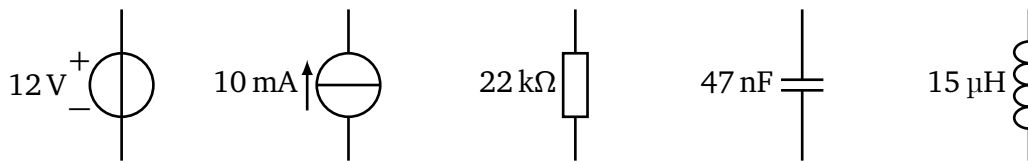


Figure 7: Symbols with values and units.

The code to produce these symbols:

```

1 \begin{circuitikz}
2 \draw (0,0) to[V=\SI{12}{\volt}] ++(0,2);
3 \draw (3,0) to[I,label=\SI{10}{\milli\ampere}] ++(0,2);
4 \draw (6,0) to[R=\SI{22}{\kilo\ohm}] ++(0,2);
5 \draw (9,0) to[C=\SI{47}{\nano\farad}] ++(0,2);
6 \draw (12,0) to[L=\SI{15}{\micro\henry}] ++(0,2);
7 \end{circuitikz}

```

Rotating current sources

Using the `mirror` and `invert` options, together with using `l_`, it is possible to rotate current sources.

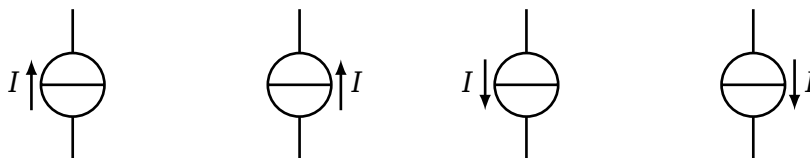


Figure 8: Different orientations of current sources.

The code to produce these symbols:

```

1 \begin{circuitikz}
2 \draw (3,0) to[I,l=$I$] ++(0,2);
3 \draw (6,0) to[I,l_=$I$,mirror] ++(0,2);
4 \draw (9,0) to[I,l=$I$,invert] ++(0,2);
5 \draw (12,0) to[I,l_=$I$,mirror,invert] ++(0,2);
6 \end{circuitikz}

```

Changes to the `circuitikz` package

The `circuitikz-dutch` package changes the following:

- Voltage sources have ‘+’ and ‘−’ glyphs left or right;
- Current sources have an arrow left or right;
- Resistors are of European type;
- Inductors are of American type;
- Voltages across components have ‘+’ and ‘−’ glyphs left or right;
- Line width is set to 1 pt for all TikZ pictures;
- Relative thickness of bipoles, tripoles and quadpoles are set to 1;
- The proportions of the components are set to better proportions;
- The package `siunitx` is loaded;

Example network

In Figure 9 you see a network with a simplified model of an opamp.

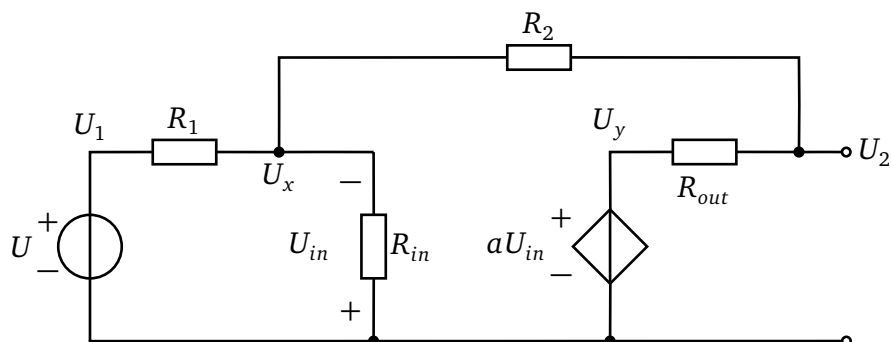


Figure 9: Network with a simplified model of an opamp.

The code to produce this circuit is show below:

```

1 \begin{tikzpicture}[scale=1.25]
2 \draw (0,0) to[V, v=$U_1$] ++(0,2) node[above] {$U_1$}
3           to[R, R=$R_1$, -*] ++(2,0) node (2) {} node[below] {$U_x$}
4 (2.center) to[short] ++(1,0)
5           to[open] ++(0,-2)
6           to[R, a=$R_{in}$, v^>=$U_{in}$, *-] ++(0,2)
7 (2.center) to[short] ++(0,1)
8           to[R=$R_2$] ++(5.5,0)
9           to[short, -*] ++(0,-1) node (3) {}
10          to[short, -o] ++(0.5,0) node[right] {$U_2$}
11 (3.center) to[R=$R_{out}$] ++(-2,0) node [above] {$U_y$}

```

```

12         to[cV, v_<=$aU_{in}$,-*] ++(0,-2)
13         to[open] ++(2.5,0)
14         to[short, o-.] (0,0)
15     ;
16 \end{tikzpicture}

```

Changelog

Version	Date	What
v0.1	2020/03/08	First release
v0.2	2021/06/12	Compliant with Circuitikz 1.3.7
v0.2 β	2021/07/28	Compliant with Circuitikz 1.4.2