circuitikz-dutch

Drawing Electric Circuits in Dutch Textbooks

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

License and warranty

Package loading

Load the package by:

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

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

The symbols

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

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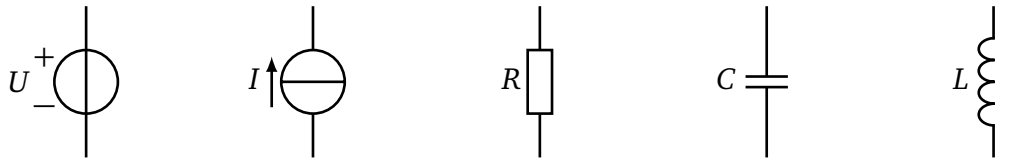

Figure 1: *Dutch symbols for voltage source, current source, resistor, capacitor and inductor.*

The CircuiTi*k*Z code to produce these symbols is shown below:

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

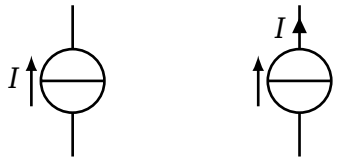

Figure 2: *Differences in drawing current sources.*

The CircuiTi*k*Z code to produce these symbols is shown below:

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

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

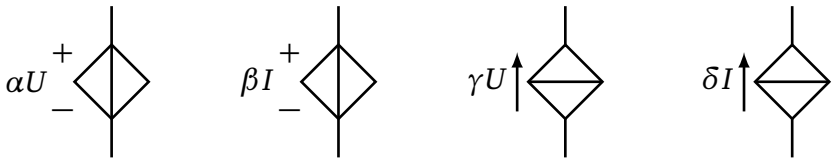

Figure 3: *Symbols for dependant sources.*

The code is shown below:

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

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

Sinusiodal sources are shown below:

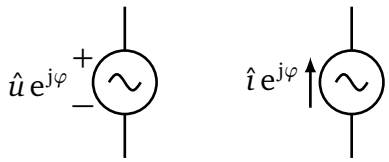

Figure 4: *Symbols for sinusiodal sources.*

Code to produce these symbols:

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

Batteries are shown in Figure 5.

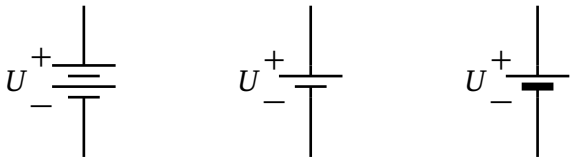

Figure 5: *Symbols for batteries.*

Code to produce these symbols:

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

Voltages across components are displayed with '+' and '–', as shown in Figure 6.

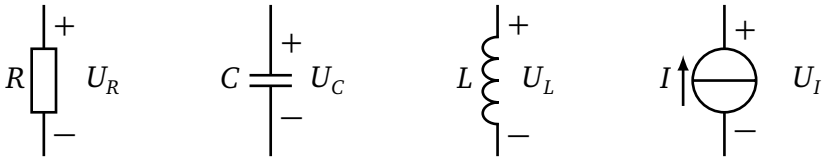

Figure 6: *Symbols with voltages.*

The code to produce the symbols is shown below:

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

Displaying values and units

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

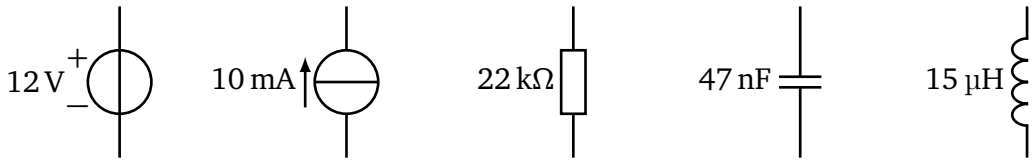

Figure 7: *Symbols with values and units.*

The code to produce these symbols:

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

Rotating current sources

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

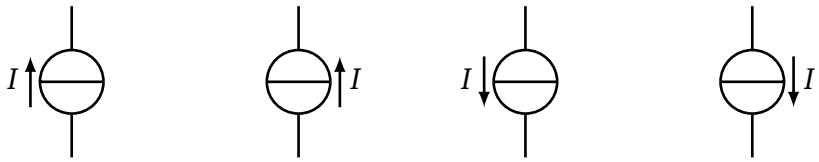

Figure 8: *Different orientations of current sources.*

The code to produce these symbols:

```
\begin{circuitikz}
\draw (3,0) to[I,l=$I$] ++(0,2);
\draw (6,0) to[I,l_=$I$,mirror] ++(0,2);
\draw (9,0) to[I,l=$I$,invert] ++(0,2);
\draw (12,0) to[I,l_=$I$,mirror,invert] ++(0,2);
\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 Ti*k*Z 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.

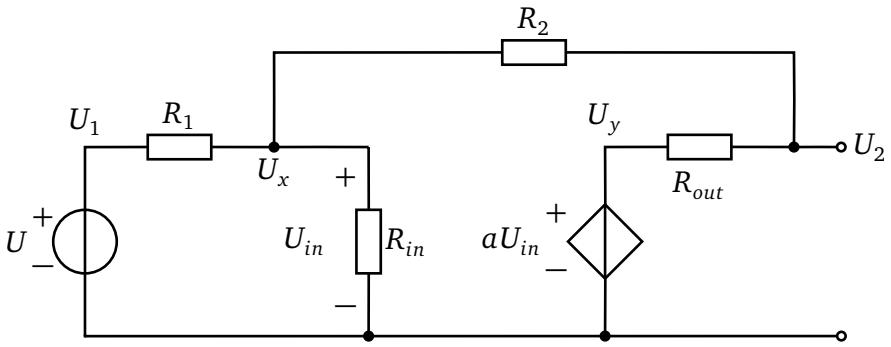

Figure 9: *Network with a simplified model of an opamp.*

The code to produce this circuit is show below:

```
\begin{tikzpicture}[scale=1.25]
\draw (0,0) to[V, v=$U$] ++(0,2) node[above] {$U_1$}
            to[R, R=$R_1$, -*] ++(2,0) node (2) {} node[below] {$U_x$}
 (2.center) to[short] ++(1,0)
            to[open] ++(0,-2)
            to[R, a=$R_{in}$, v^<=$U_{in}$,*-] ++(0,2)
 (2.center) to[short] ++(0,1)
            to[R=$R_2$] ++(5.5,0)
            to[short,-*] ++(0,-1) node (3) {}
            to[short,-o] ++(0.5,0) node[right] {$U_{2}$}
 (3.center) to[R=$R_{out}$] ++(-2,0)  node [above] {$U_y$}
```

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

Changelog

Version	Date	What
v0.1	2020/03/08	First release
v0.2	2021/06/12	Compliant with Circuitikz 1.3.7
v0.2.1	2021/06/22	Compliant with Circuitikz 1.3.8