Application of linear systems: Flow

Corresponding linear system:

\[ \begin{align*}
    x + w &= 1500 \\
    x + y &= 1500 \\
    y + z &= 2000 \\
    w + z &= 2000
\end{align*} \]

(image from the Tennessee Higher Education Commission)
Application of linear systems: Flow

Corresponding linear system:

\[ x + w = 1500 \]
\[ x + y = 1500 \]
\[ y + z = 2000 \]
\[ w + z = 2000 \]
Application of linear systems: Flow

Kirchoff's Current Law: Current into a node equals current out.

Kirchoff's Voltage Law: Voltage rise equals voltage drop around any closed loop in a circuit.

Corresponding linear system:

\[-I_1 + I_2 - I_3 = 0\]

\[4I_1 + 2I_2 = 28\]

\[2I_2 + I_3 = 7\]
Kirchoff’s Current Law: Current into a node equals current out.
Kirchoff’s Current Law: Current into a node equals current out.

Kirchoff’s Voltage Law: Voltage rise equals voltage drop around any closed loop in a circuit.
Kirchhoff’s Current Law: Current into a node equals current out.

Kirchhoff’s Voltage Law: Voltage rise equals voltage drop around any closed loop in a circuit.

Corresponding linear system:

\[-l_1 + l_2 - l_3 = 0\]

\[4l_1 + 2l_2 = 28\]

\[2l_2 + l_3 = 7\]