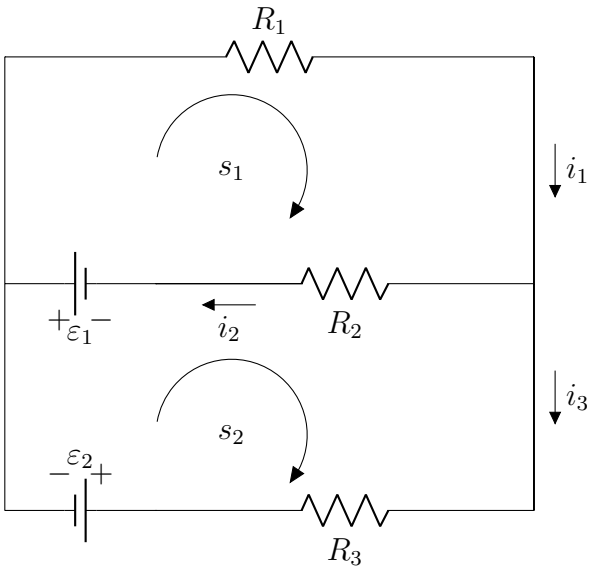
1 Learning KVL & KCL



Assume an electric network consisting of two voltage sources and three resistors. According to the first law we have

$$i_1 = i_2 + i_3$$

The second law applied to the closed circuit s_1 gives

$$-R_2 i_2 + \varepsilon_1 + (-R_1 i_1) = 0$$

The second law applied to the closed circuit s_2 gives

$$-R_3 i_3 - \varepsilon_2 - \varepsilon_1 + R_2 i_2 = 0$$

Thus we get a system of linear equations in i_1, i_2, i_3 :

$$\begin{cases} i_2 = i_1 + i_3 \\ -R_2 i_2 + \varepsilon_1 + (-R_1 i_1) = 0 \\ -R_3 i_3 - \varepsilon_2 - \varepsilon_1 + R_2 i_2 = 0 \end{cases}$$