

Equivalent Circuits

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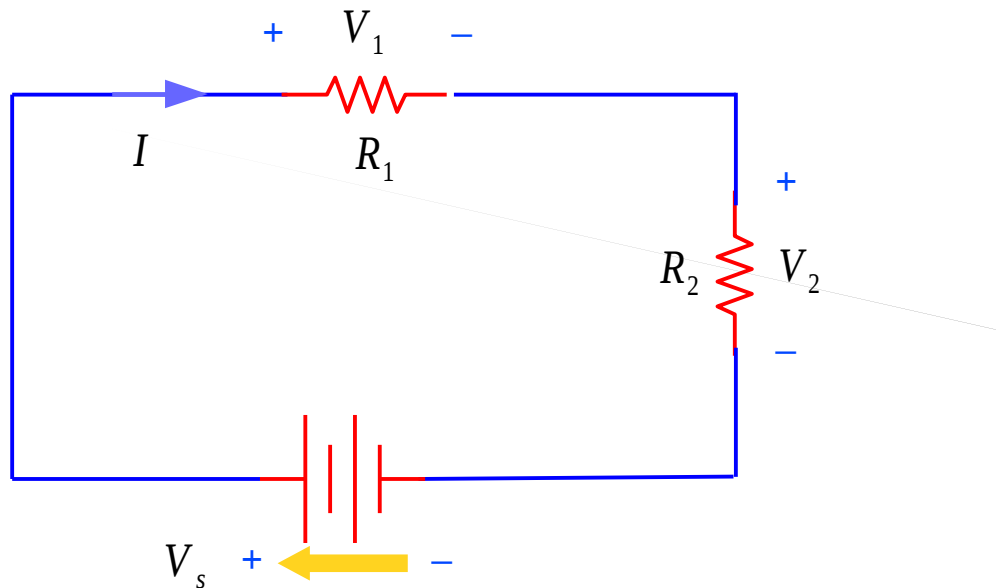
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Voltage Divider

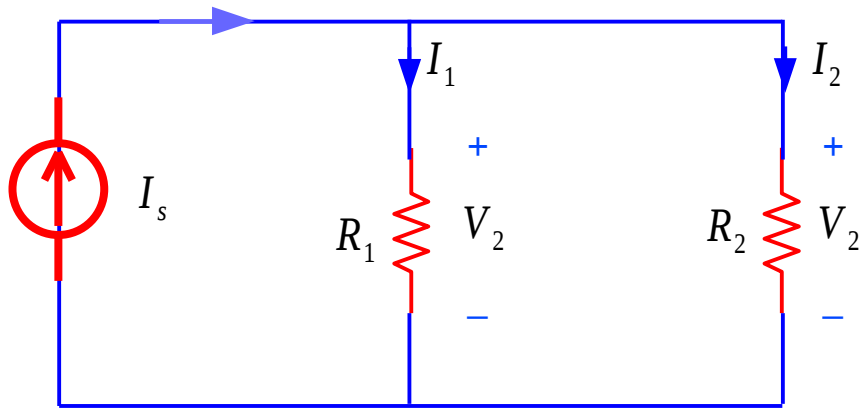


$$V_1 : V_2 = R_1 : R_2$$

$$V_1 = \left(\frac{R_1}{R_1 + R_2} \right) V_s$$

$$V_2 = \left(\frac{R_2}{R_1 + R_2} \right) V_s$$

Current Divider

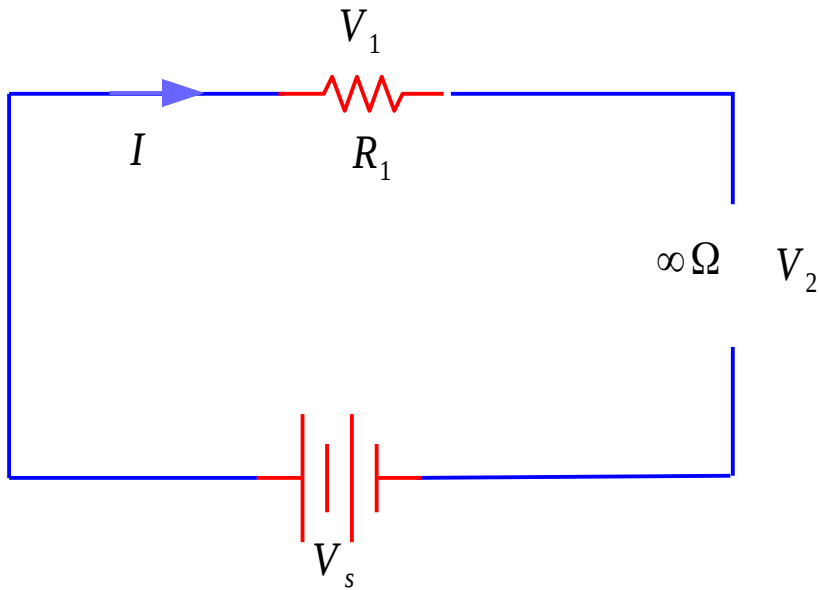


$$I_1 : I_2 = R_2 : R_1$$

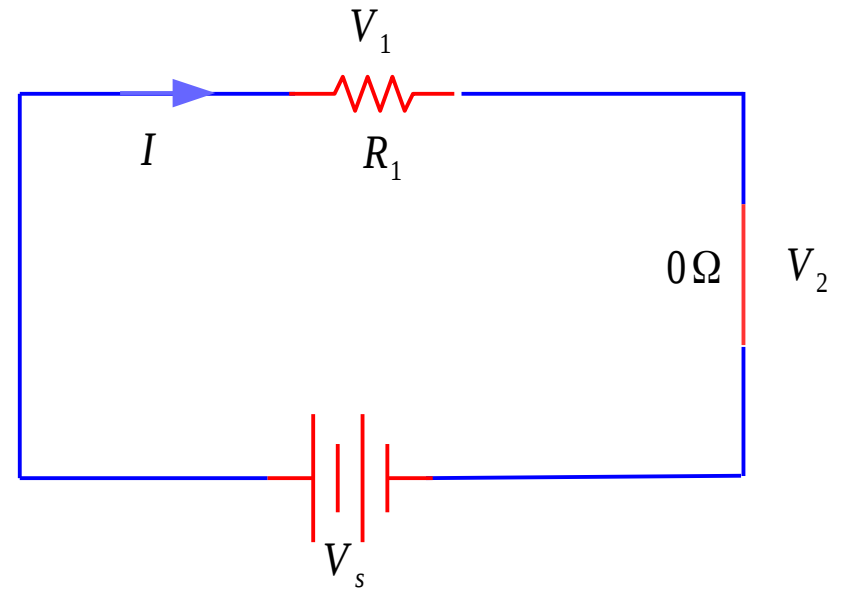
$$I_1 = \left(\frac{R_2}{R_1 + R_2} \right) I_s$$

$$I_2 = \left(\frac{R_1}{R_1 + R_2} \right) I_s$$

Max Voltage



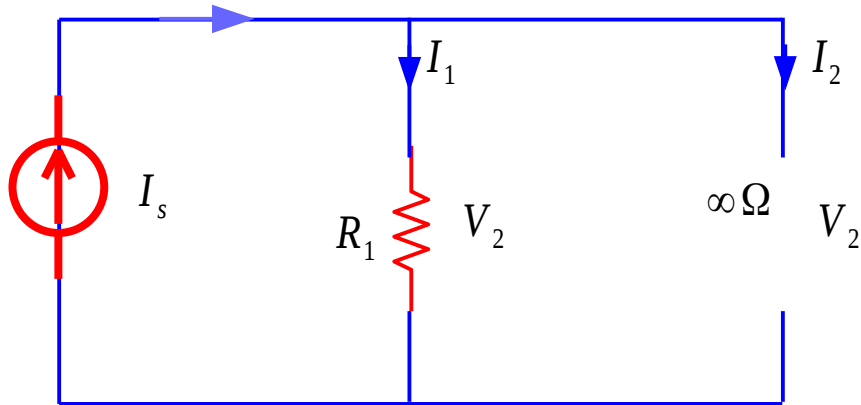
$$V_1 = \left(\frac{R_1}{R_1 + \infty} \right) V_s = 0$$
$$V_2 = \left(\frac{\infty}{R_1 + \infty} \right) V_s = V_s$$



$$V_1 = \left(\frac{R_1}{R_1 + 0} \right) V_s = V_s$$
$$V_2 = \left(\frac{0}{R_1 + 0} \right) V_s = 0$$

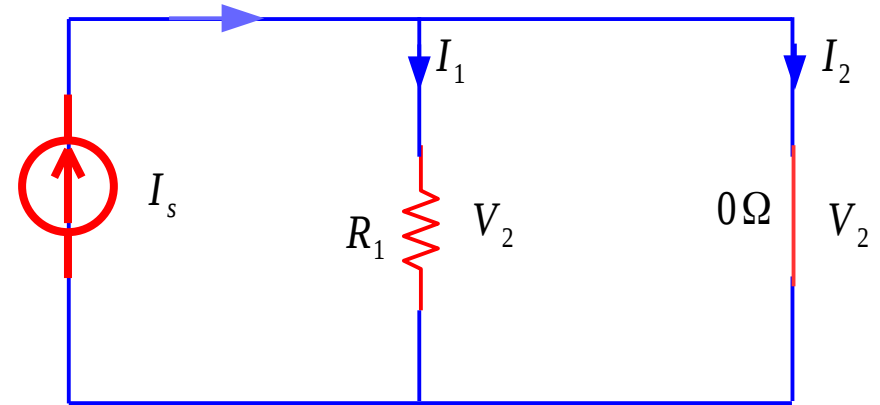
$$0 \leq V_2 \leq V_s \quad \text{max voltage}$$

Max Current



$$I_1 = \left(\frac{\infty}{R_1 + \infty} \right) I_s = I_s$$

$$I_2 = \left(\frac{R_1}{R_1 + \infty} \right) I_s = 0$$

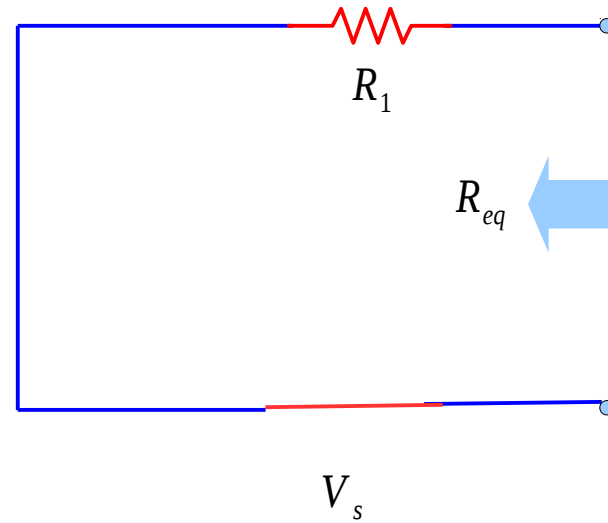
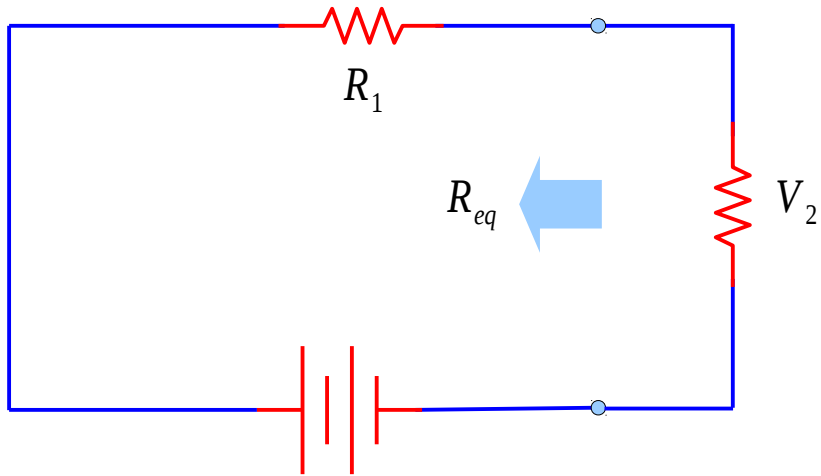


$$I_1 = \left(\frac{0}{R_1 + 0} \right) I_s = 0$$

$$I_2 = \left(\frac{R_1}{R_1 + 0} \right) I_s = I_s$$

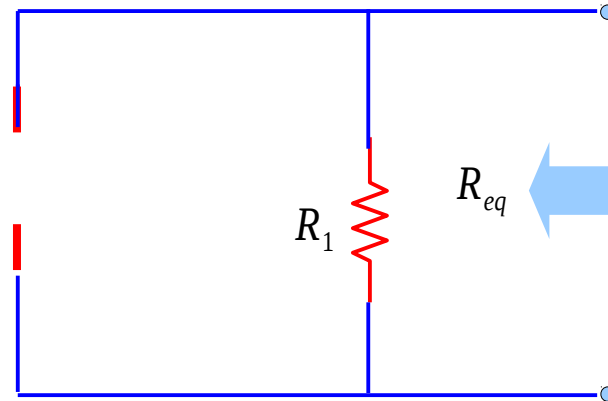
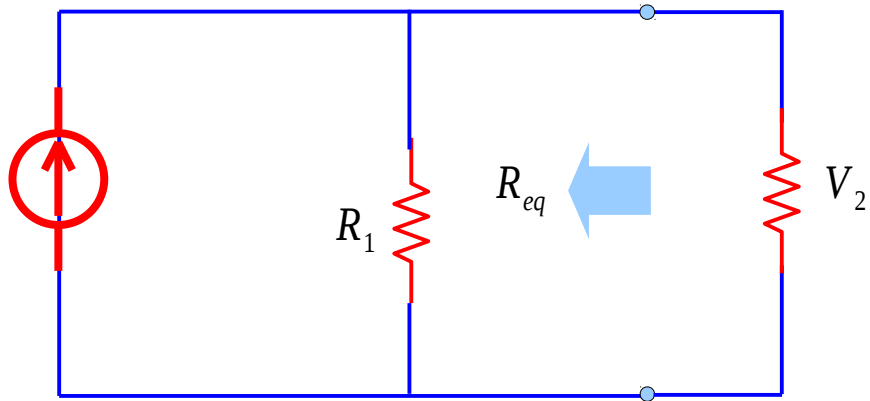
$$0 \leq I_2 \leq I_s \text{ max current}$$

Equivalent Resistance



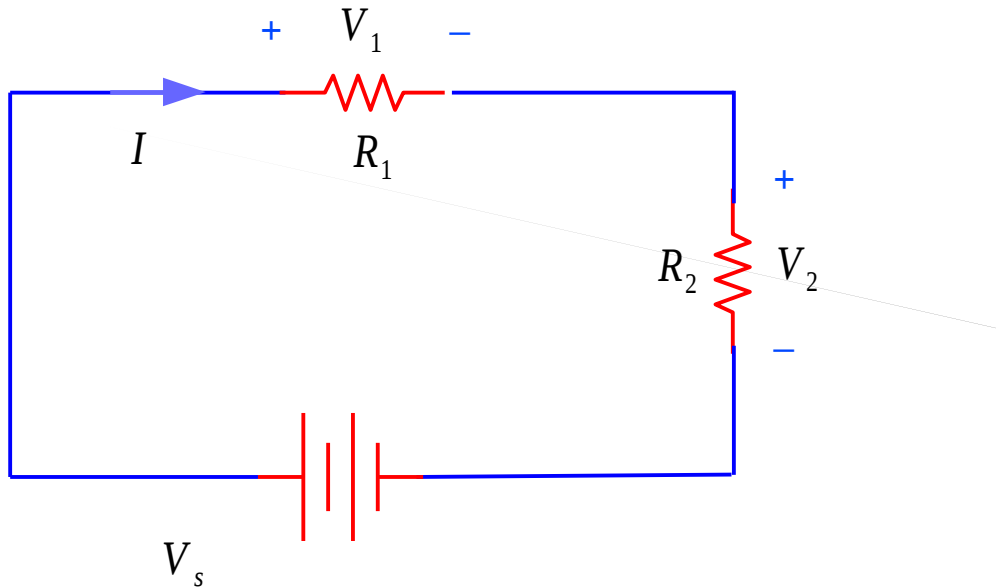
$$R_{eq} = R_1$$

Equivalent Resistance



$$R_{eq} = R_1$$

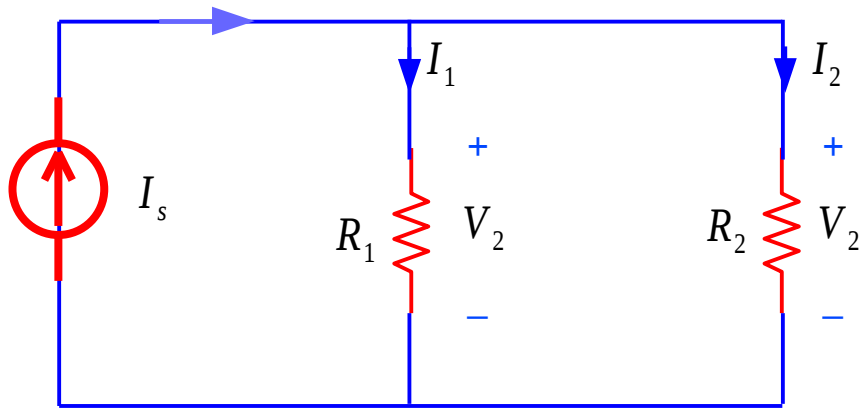
Thevenin's Voltage Divider



$$V_2 = \left(\frac{R_2}{R_{eq} + R_2} \right) V_s$$

divided max voltage

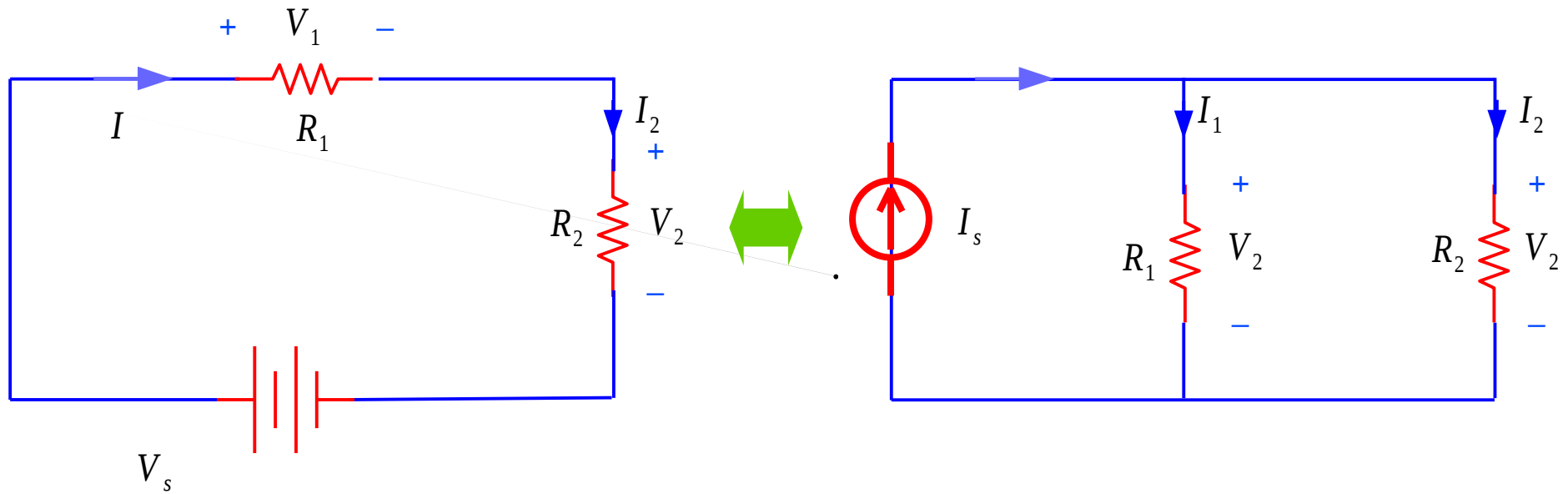
Norton's Current Divider



$$I_2 = \left(\frac{R_{eq}}{R_{eq} + R_2} \right) I_s$$

divided max current

Thevenin and Norton Theorems



$$V_2 = \left(\frac{R_2}{R_{eq} + R_2} \right) V_s$$



$$I_2 = \left(\frac{R_{eq}}{R_{eq} + R_2} \right) I_s$$

$$V_s = R_{eq} \cdot I_s$$

References

- [1] <http://en.wikipedia.org/>
- [2] www.allaboutcircuits.com
- [3]