

ECE 203

Circuits I

Source Transformation

Lecture 7-2

Source Transformation

It can be shown that a voltage source in series with a resistor is functionally equivalent to a current source in parallel with a resistor.

Example: [Go to Example 7-2.1](#)

Transforming a voltage source into a current source

Can replace a voltage source in series with a resistor, with a current source in parallel with a resistor.

The current of the new source is:

$$I = V/R_{\text{series}}$$

The value of the resistance remains the same.

Transforming a current source into a voltage source

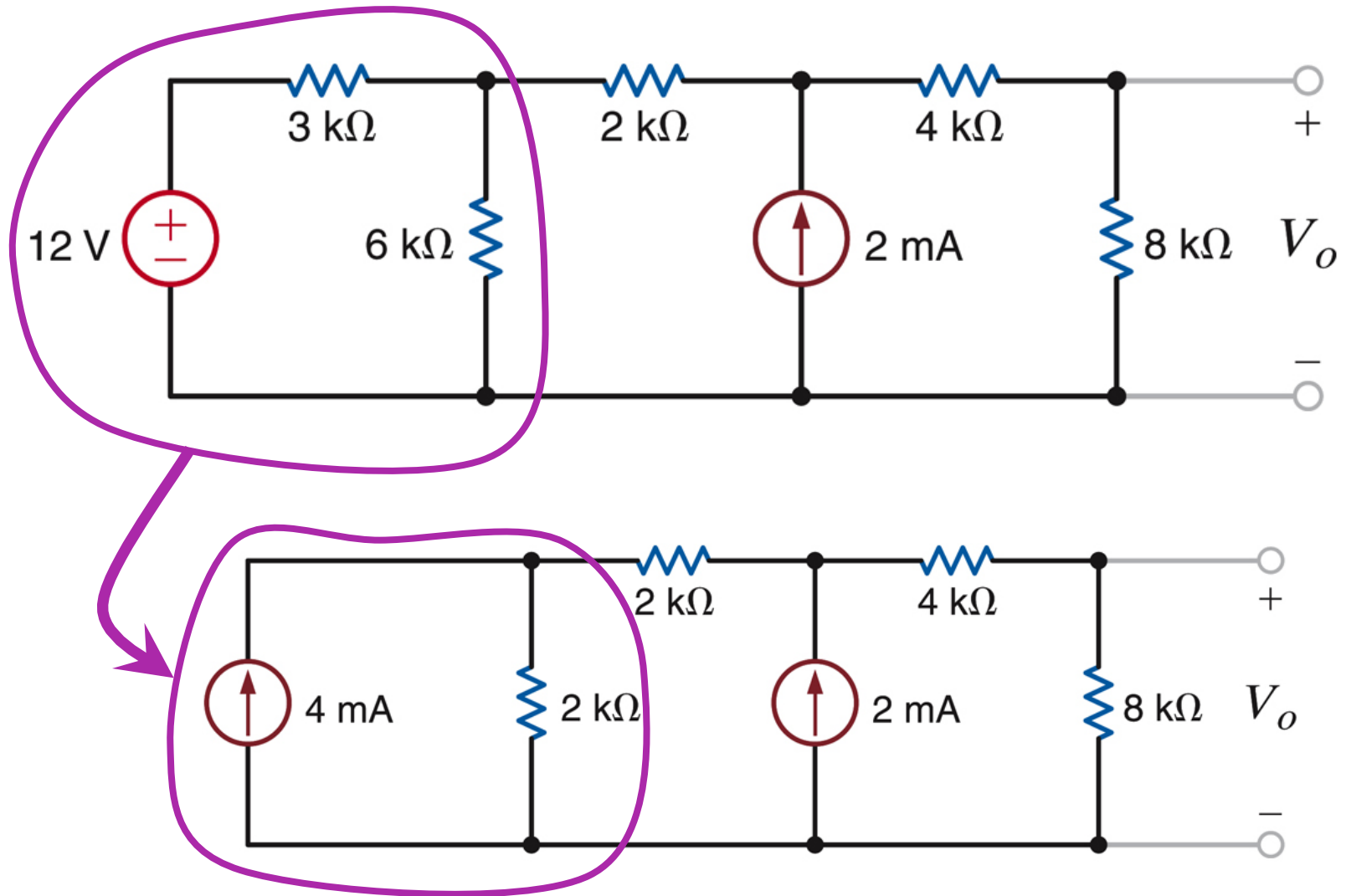
Can replace a current source in parallel with a resistor, with a voltage source in series with a resistor.

The voltage of the new source is:

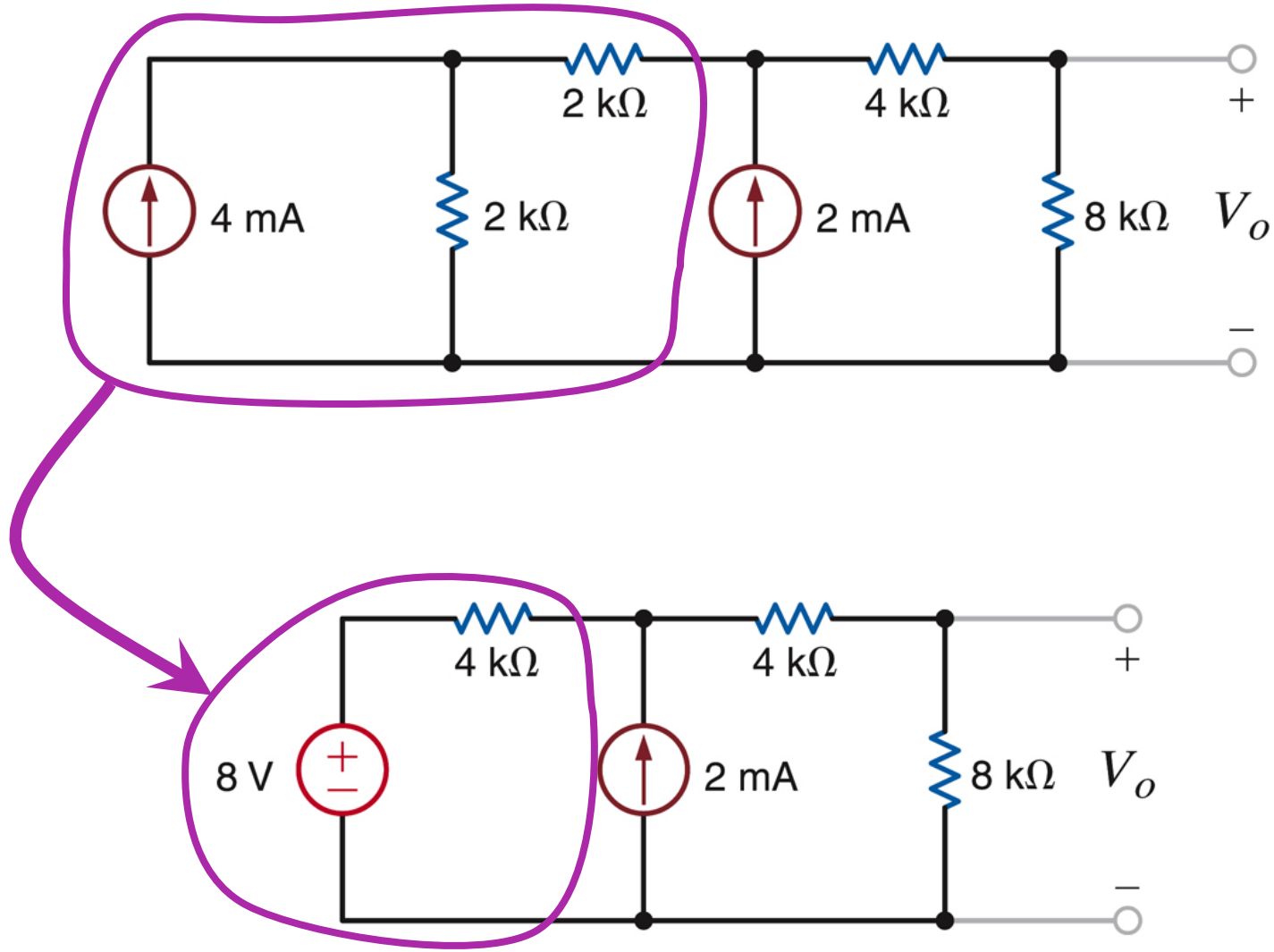
$$V = IR_{\text{parallel}}$$

The value of the resistance remains the same.

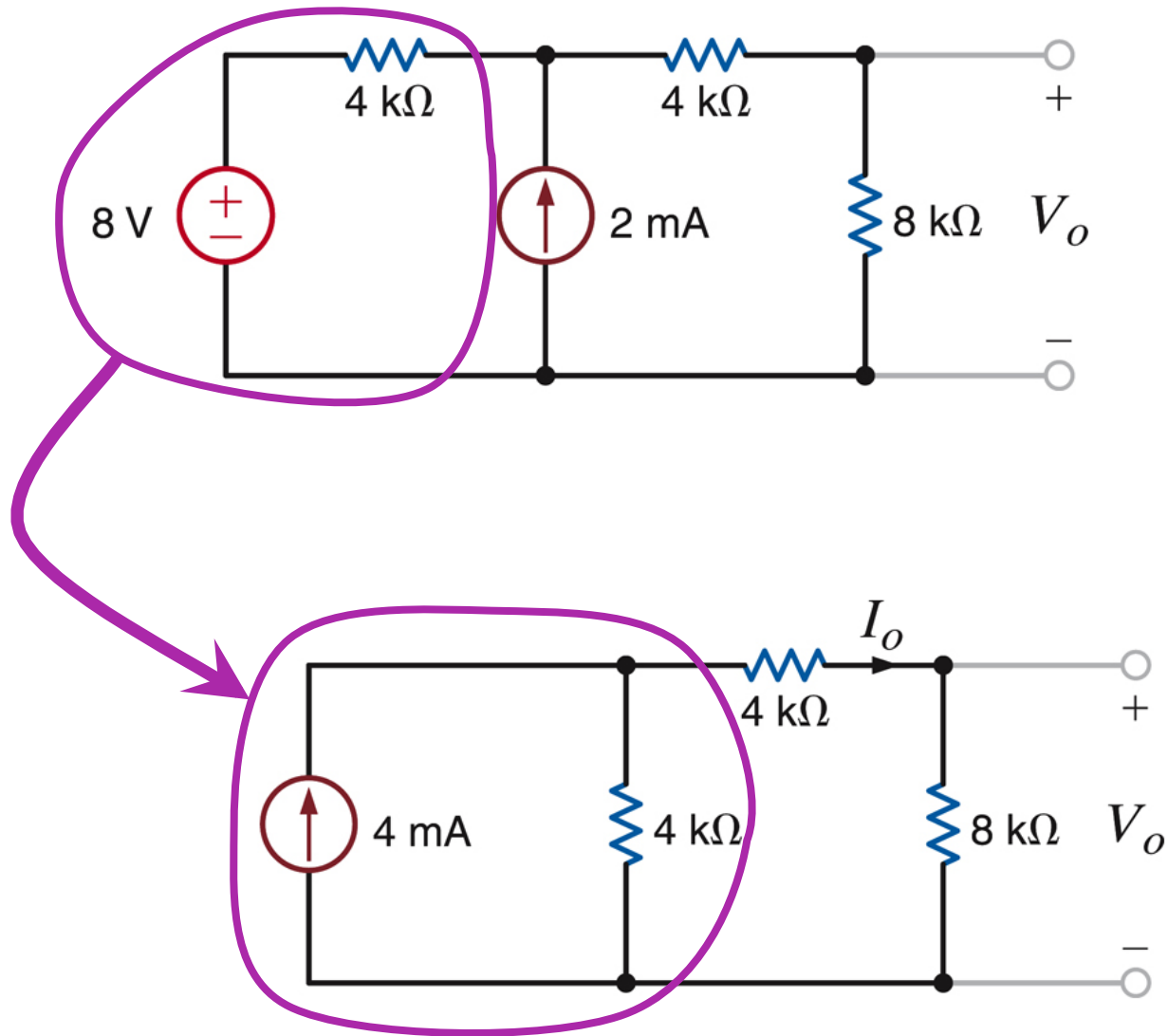
Source Transformation or Exchange



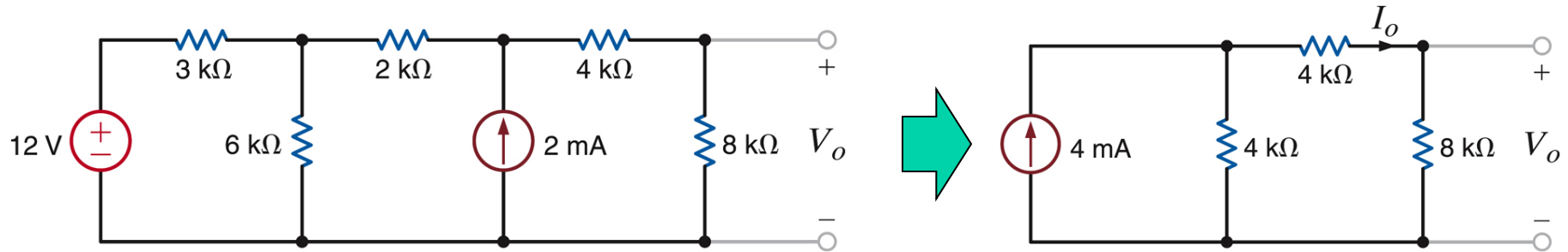
Source Transformation or Exchange



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Source Transformation or Exchange



$$I_o = (4 \times 10^{-3}) \left(\frac{4\text{k}}{4\text{k} + 4\text{k} + 8\text{k}} \right) = 1 \text{ mA}$$

$$V_o = (1 \times 10^{-3})(8\text{k}) = 8 \text{ V}$$

More source transform examples

Go to examples 7-2.2 and 7-2.3