ee101_thevenin_1.sqproj

Description

Shown in Fig. 1 (a) is a circuit for which we want to compute the Thevenin equivalent circuit. Fig. 1 (b) shows the Thevenin equivalent circuit with a voltage source connected between A and B. V_s and I_s follow the relationship,

$$V_s = V_{Th} + I_s\, R_{Th}\,. \tag{1}$$

In other words, if V_s is plotted as a function of I_s, we expect to obtain a straight line with a y-intercept equal to V_{Th} and an x-intercept equal to V_{Th}/R_{Th}. From this information, we can obtain V_{Th} and R_{Th}.

Exercise Set

1. What is V_{Th} and R_{Th} for the circuit shown in Fig. 1 (a) as seen from AB?

2. Simulate the circuit shown in Fig. 1 (a) with a voltage source connected between A and B. Plot V_s versus I_s and obtain V_{Th}, R_{Th} from the graph. Compare with the result you obtained analytically in (1).

3. Replace the voltage source between A and B with a resistor $R = 5\,\Omega$. What is the expected value of current through R? Simulate the circuit and verify your answer.

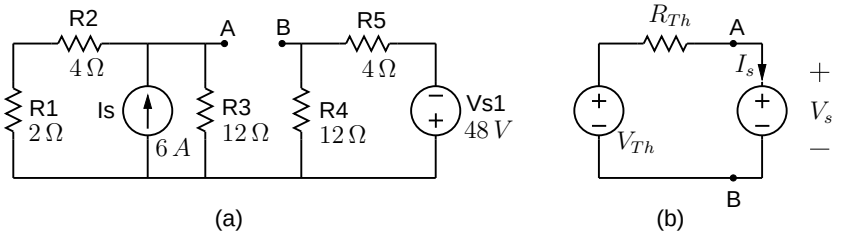

Figure 1: (a) Example for Thevenin equivalent circuit, (b) Thevenin equivalent circuit with a voltage source connected between A and B.