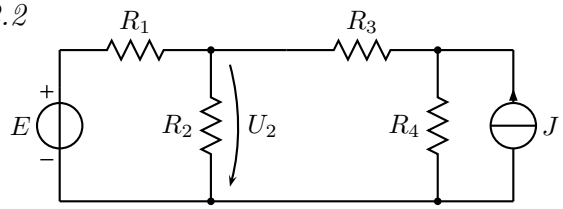
ELEC-C9610 Basics of Electronics

Calculation assignment 2. Deadline 14:00, September 28th, 2021

2.1 When using the superposition method to analyze a circuit, we turn off sources in turn. Turning off a voltage source means to replace it by a short circuit. Turning off a current source is realized by replacing it by an open circuit. Now, explain,

a) why turning off a voltage source canNOT be realized by replacing it by an open circuit and
b) why turning off a current source canNOT be realized by replacing it by a short circuit.

2.2

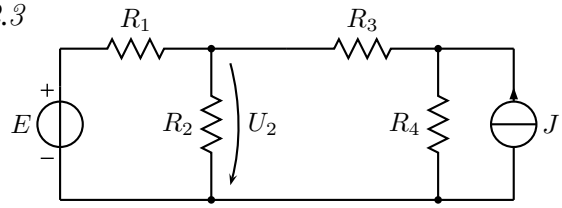


$R_1 = 3\ \Omega$, $R_2 = 6\ \Omega$, $R_3 = 2\ \Omega$, $R_4 = 8\ \Omega$, $E = 9$ V and $J = 5$ A.

a) The use of the Tevenin's method: Find the voltage U_2 over the resistance R_2 by expressing the circuit by voltage sources and resistances (NO use of a current source).

b) The use of the Norton's method: Find the voltage U_2 over the resistance R_2 by expressing the circuit by current sources and resistances (NO use of a voltage source). Do you get the same voltage value as a)?

2.3



$R_1 = 3\ \Omega$, $R_2 = 6\ \Omega$, $R_3 = 2\ \Omega$, $R_4 = 8\ \Omega$, $E = 9$ V and $J = 5$ A.

Find the voltage U_2 over the resistance R_2 using the superposition method. Do you get the same voltage value as exercise 2.2?

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