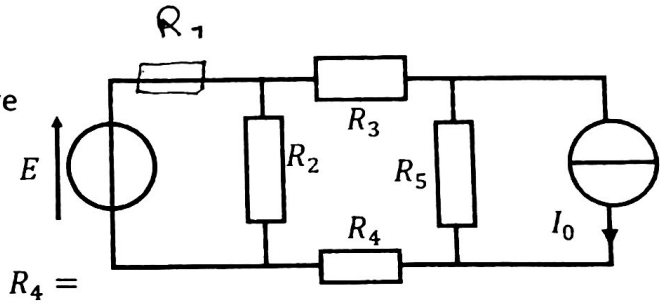
TD 0: SUP brief review

Exercise 1



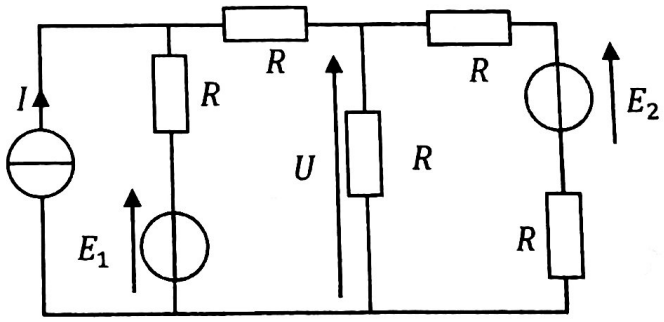
Let's consider the circuit nearby. Following data are given:

- $E = 10V, I_0 = 10mA$
- $R_1 = 1k\Omega, \quad R_2 = 1{,}2k\Omega, \quad R_3 = 500\Omega, \quad R_4 = 1{,}5\ k\Omega, R_5 = 2k\Omega$

Determine Thévenin's generator as seen by R_2. Use any method that you prefer (Equivalence or theorem directly), you will express your result in terms of I_0, E and R_i.

Deduce then the voltage at R_2's terminals.

Exercise 2



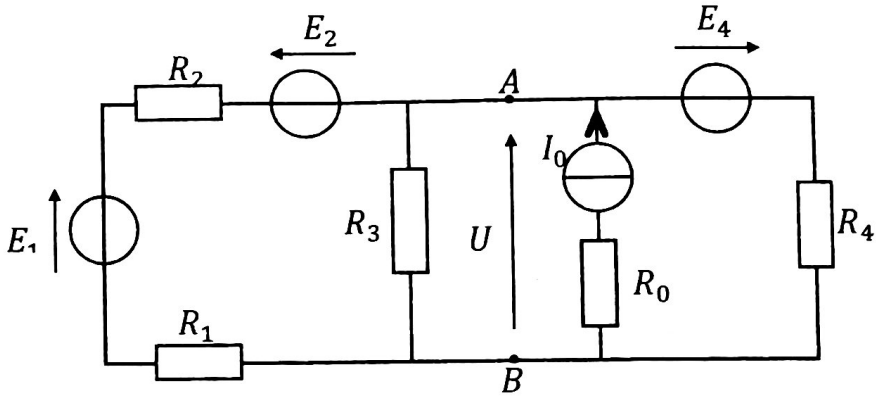
Let's consider the circuit nearby. We assume that E_1, E_2, I and R are known and that sources are independent.

Determine the expression of voltage U by using the most appropriate method (namely Kirchoff's law, superposition, Thévenin's, Norton's or Millman's theorems) by explaining your reasoning.

Exercise 3

In the following circuit:

$$E_1 = 20\,V \quad E_2 = 5\,V$$
$$E_4 = 10\,V$$
$$I_0 = 0{,}25\,mA \quad R_0 = 1k\Omega$$
$$R_1 = 10\,k\Omega \quad R_2 = 50\,k\Omega$$
$$R_3 = 12\,k\Omega$$



Determine the expression of voltage U by using the most appropriate method (as above, for instance Kirchoff's law, etc.). You will express U in terms of E_1, E_2, E_4, I_0 and resistances R_i.

Exercise 4

Let's study the circuit nearby.

Determine U.