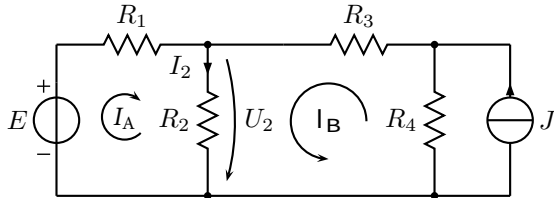


# ELEC-C9610 Basics of Electronics

## Calculation assignment 3. Deadline 14:00, October 5th, 2021

3.1

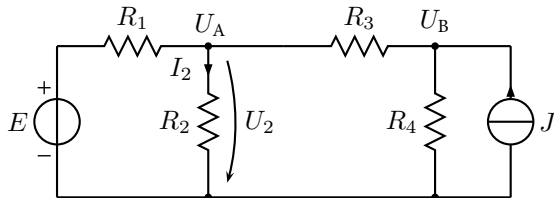


$$R_1 = 3 \Omega \quad R_2 = 6 \Omega \quad R_3 = 2 \Omega \quad R_4 = 8 \Omega$$

$$E = 9 \text{ V} \quad J = 5 \text{ A.}$$

Find the current  $I_2$  over the resistance  $R_2$  using the mesh current method. Formulate a linear matrix equation heuristically (see lecture slides) for loop currents  $I_A$  and  $I_B$ .

3.2

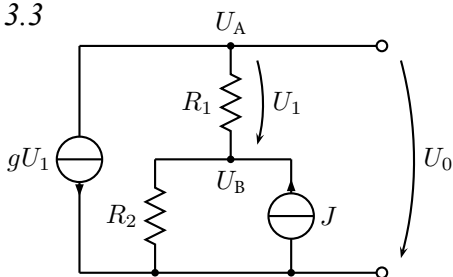


$$R_1 = 3 \Omega \quad R_2 = 6 \Omega \quad R_3 = 2 \Omega \quad R_4 = 8 \Omega$$

$$E = 9 \text{ V} \quad J = 5 \text{ A.}$$

Find the voltage  $U_2$  over the resistance  $R_2$  using the node voltage method. Formulate a linear matrix equation heuristically (see lecture slides) for voltages  $U_A$  and  $U_B$ . This is the same circuit as exercise 3.1. Do you get a consistent voltage value of  $U_2 = I_2 R_2$  which was derived in exercise 3.1?

3.3



$$J = 1 \text{ A} \quad g = 20 \text{ mS} \quad R_1 = 10 \Omega$$

$$R_2 = 30 \Omega.$$

In this exercise, we study the treatment of dependent sources in the circuit analysis. Use the node voltage method to find the voltage  $U_0$ . Formulate a linear matrix equation heuristically for voltages  $U_A$  and  $U_B$ .