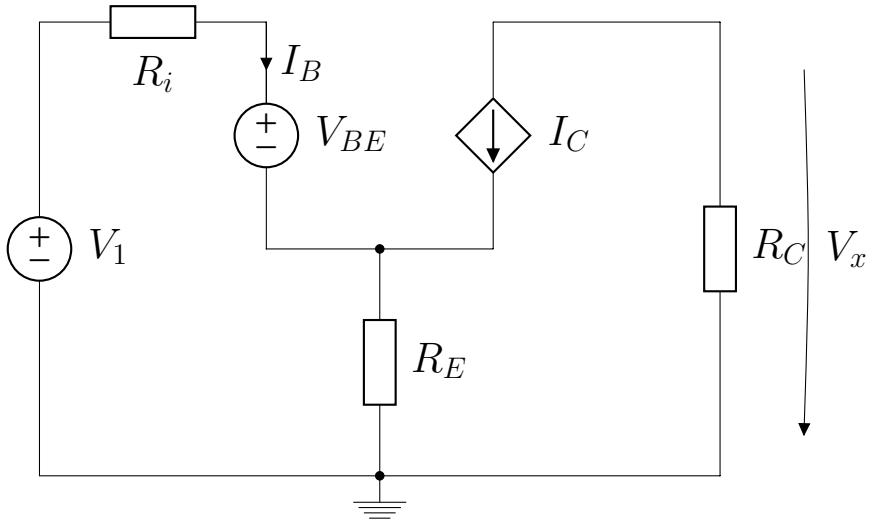
# Seminars - 6th week

1. To determine operating point, common-emitter amplifier circuit with bipolar junction transistor was replaced by its model for DC conditions according to the figure below. The values of circuit elements are: $R_E = 1.5\,\mathrm{k\Omega}$, $R_C = 6.8\,\mathrm{k\Omega}$, $R_i = 75\,\mathrm{k\Omega}$, $U_{BE} = 0.7\,\mathrm{V}$, $\beta = 300$, $V_1 = 3\,\mathrm{V}$. $I_C = \beta I_B$.

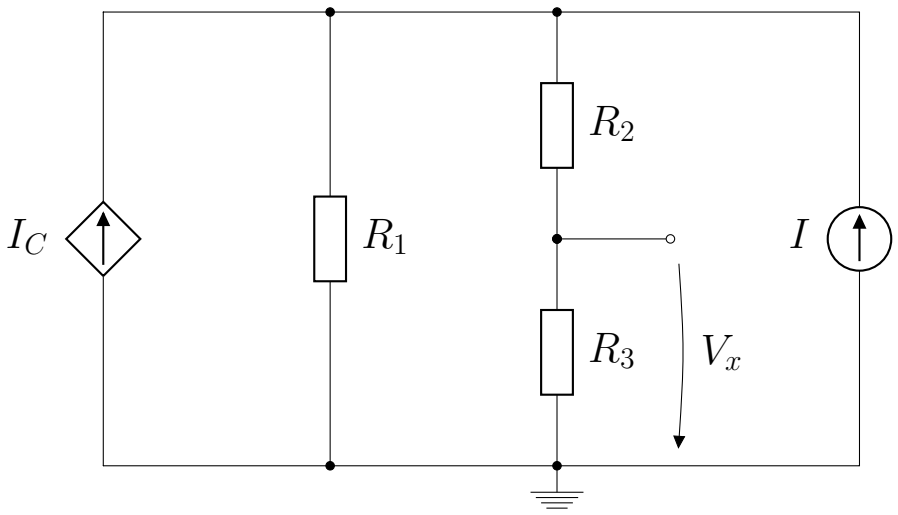
   a) Calculate current $I_B$.
   b) Calculate the voltage $V_x$.



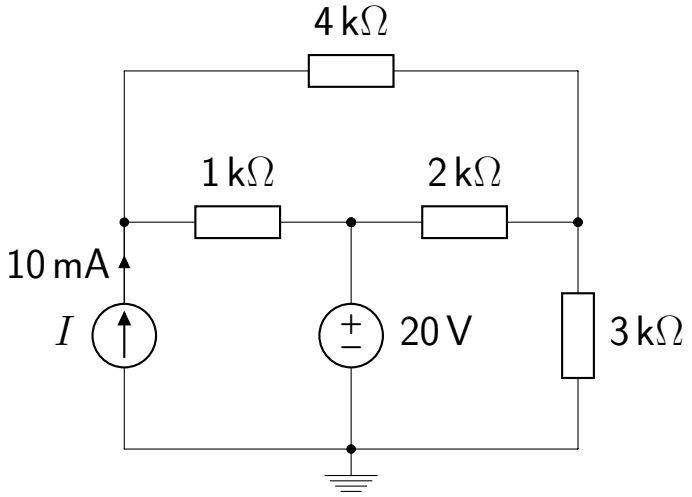

2. In the circuit in figure below:

   a) Calculate the voltage $V_x$.
   b) Find the Thévenin equivalent circuit of the circuit in figure at terminals, where is the voltage $V_x$.

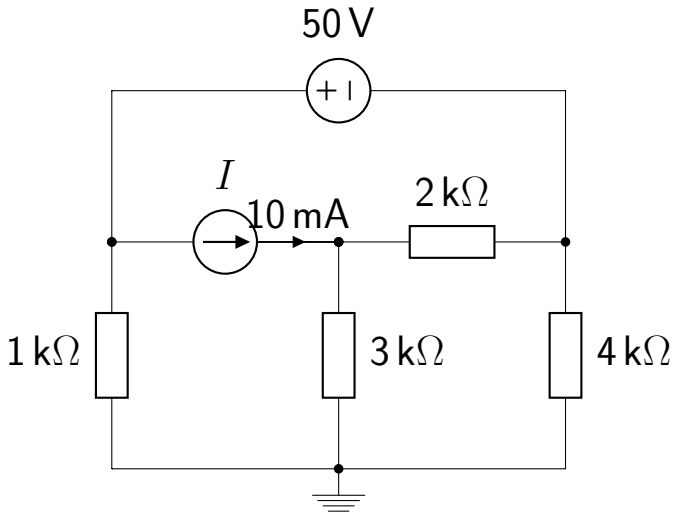
   The circuit elements have values: $R_1 = 1\,\mathrm{k\Omega}$, $R_2 = 2\,\mathrm{k\Omega}$, $R_3 = 3\,\mathrm{k\Omega}$, $G = 0.001$, $I = 9\,\mathrm{mA}$, $I_C = GV_x$.



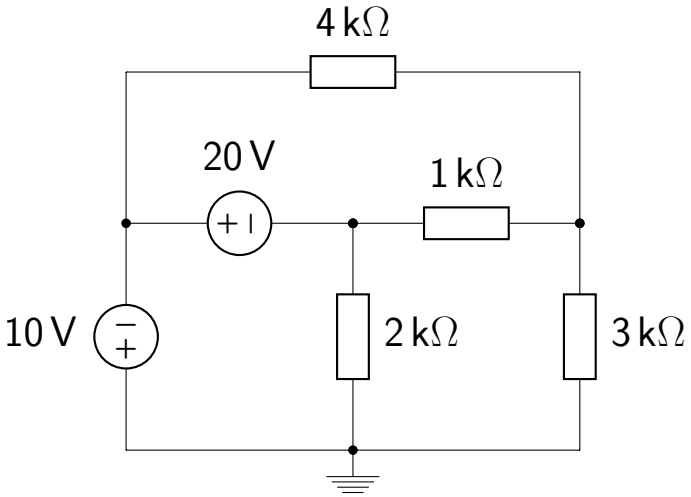

3. In the circuit below, find all nodal voltages.



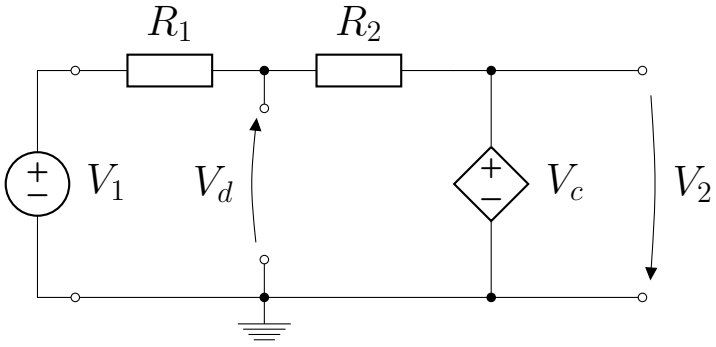

4. In the circuit below, find all nodal voltages.



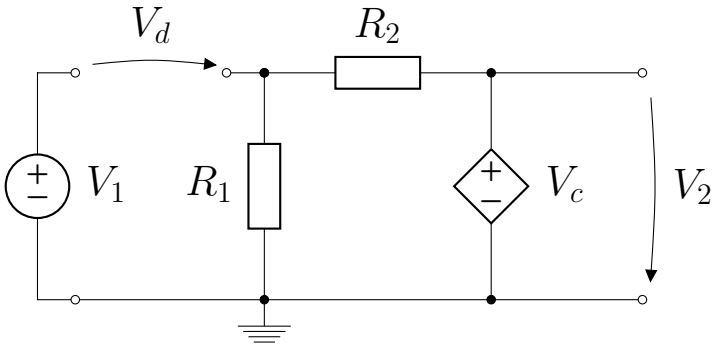
5. In the circuit below, find all nodal voltages.



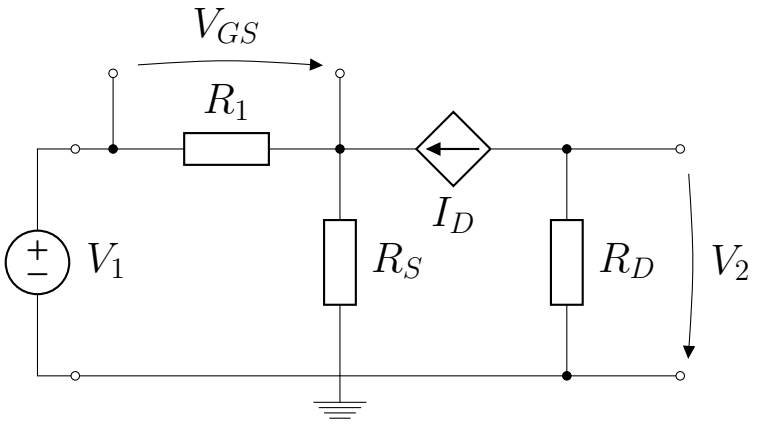

6. In the circuit below, calculate voltage $V_2$, if $V_1$ = 10 mV, $R_1$ = 1 kΩ, $R_2$ = 50 kΩ, $V_C = A \cdot V_d$, $A = 250000$.




7. In the circuit below, calculate voltage $V_2$, if $V_1$ = 10 mV, $R_1$ = 1 kΩ, $R_2$ = 50 kΩ, $V_C = A \cdot V_d$, $A = 250000$.




8. In the circuit below, calculate voltage $V_2$, if $V_1$ = 0.2 V, $R_1$ = 1 kΩ, $R_S$ = 500 Ω, $R_D$ = 20 kΩ, $I_D = G \cdot V_{GS}$, $G = 0.005$.




9. Using the mesh analysis, in the circuit below, calculate all currents. Calculate all device voltages. $V$ = 60 V, $I_1$ = 50 mA, $I_2$ = 10 mA, $R_1$ = 1 kΩ, $R_2$ = 4 kΩ, $R_3$ = 2 kΩ.