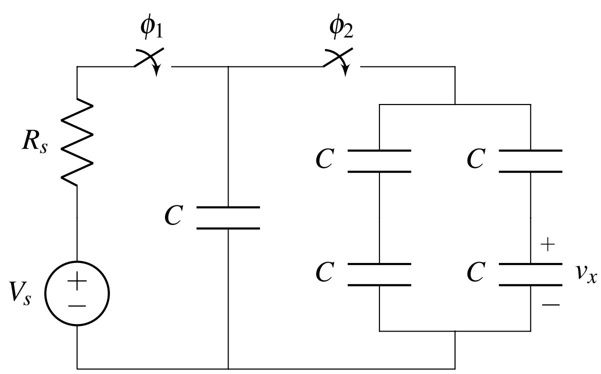
EECS 16A Designing Information Devices and Systems I
Summer 2017 D. Aranki, F. Maksimovic, V. Swamy Discussion 6B

1. **Module 2 Review**

   Optional Review Problems:

2. **Charge-Sharing (Fall 2016 MT2)**

   Initially, all capacitors are uncharged and have the same capacitance C. For $t < 0$, the switch ϕ_1 is *closed*, ϕ_2 is *open*, and the circuit has achieved steady state. Later, at $t = 0$, ϕ_1 is *open* and ϕ_2 is *closed*; then the system is allowed to reach steady state.

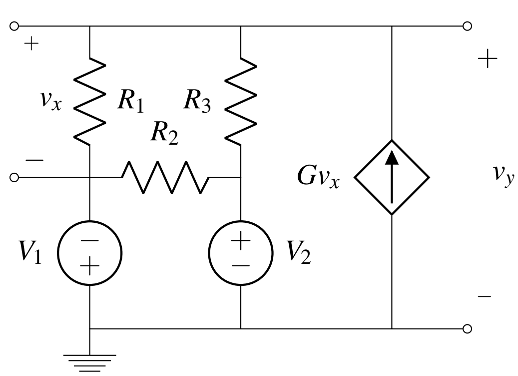


   What is the voltage v_x at $t \gg 0$?

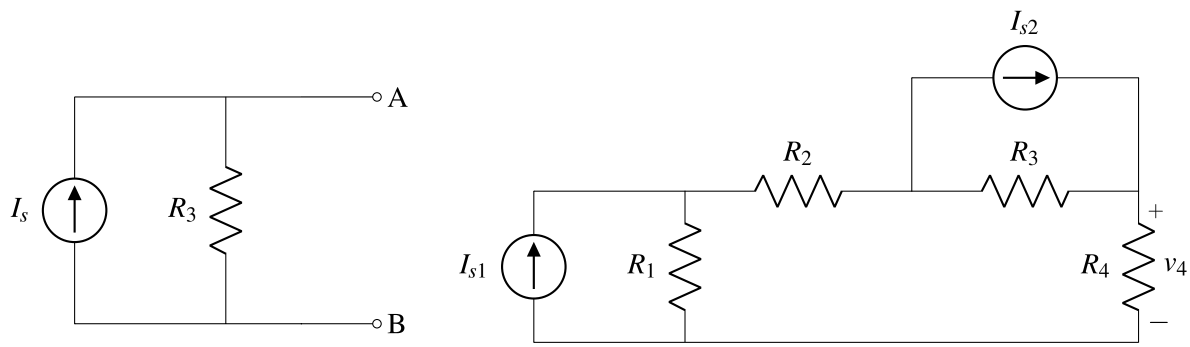
3. **Take Node of the Voltage Sources (Fall 2016 MT2)**

   Use nodal analysis to solve for the voltages v_x and v_y. Use the following values for numerical calculations. **Note the polarity on the voltage sources.**

$$V_1 = 5\,\text{V} \quad R_1 = 10\,\Omega$$
$$V_2 = 5\,\text{V} \quad R_2 = 50\,\Omega$$
$$G = \tfrac{1}{4}\text{S} \quad R_3 = 40\,\Omega$$



4. One Norton at a Time! (Spring 2017 MT2)



(a) (b)

(a) Given the circuit labeled (a), draw the Thévenin equivalent circuit for $I_s = \frac{1}{5}$A and $R_3 = 20\,\Omega$ and determine V_{th} and R_{th}.

(b) Redraw the circuit labeled (b) with the following restrictions: you must use only voltage sources and the given four resistors. Determine the value of the voltage sources given $R_1 = 30\,\Omega$, $R_2 = 10\,\Omega$, $R_3 = 20\,\Omega$, $R_4 = 10\,\Omega$, $I_{s1} = \frac{1}{3}$A, and $I_{s2} = \frac{1}{5}$A.

(c) Calculate the voltage drop across R_4.