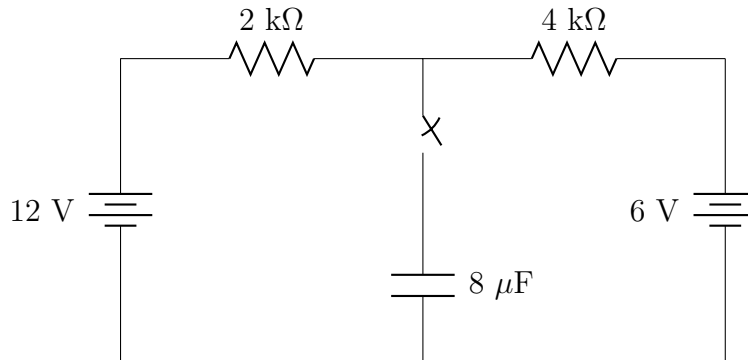


Electricity and Magnetism I (PHY 321)

Circuit problems

Problem 1 Consider the following circuit. The capacitor is initially uncharged. At $t = 0$, the switch closes.



- Just after the switch is closed, what initial currents will flow through the resistors? (How much current and in which direction?)
- After a long time, what currents will flow through the resistors?
- After a long time, what is the voltage on the capacitor?
- Find the voltage $V_c(t)$ on the capacitor, the current $I_1(t)$ flowing through the 2-kΩ resistor, and the current $I_2(t)$ flowing through the 4-kΩ resistor as functions of time. Define the capacitor voltage to be positive if the electric potential at the top of the capacitor is higher than the electric potential at the bottom, and define the currents to be positive if they are flowing to the right.