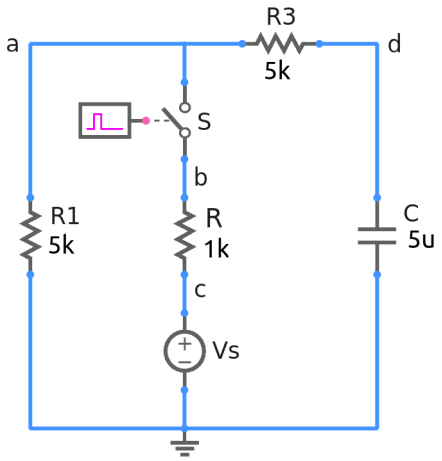
ee101_rc2.sqproj



In the RC circuit shown in the figure, the switch has been closed for a long time and is opened at $t = 0$.

Exercise Set

1. Find the initial value (at $t = 0^-$) of the capacitor voltage (V_d in the figure).

2. What is the time constant of the circuit for $t > 0$? Obtain expressions for the capacitor voltage and current for $t > 0$ sec. Use the condition that $V_C(0^+) = V_C(0^-)$.

3. Obtain the current through R_1 in two ways: (a) Use $V_C(t)$ obtained in (2). (b) Start with the general form $i_{R1}(t) = A\ \exp(-t/\tau) + B$, find A and B using conditions on i_{R1} at $t = 0^+$ and $t \to \infty$.

4. Plot $V_C(t)$ and $i_{R1}(t)$ for $-0.1\,\text{sec} < t < 0.5\,\text{sec}$.

5. Compare your plots with simulation results.