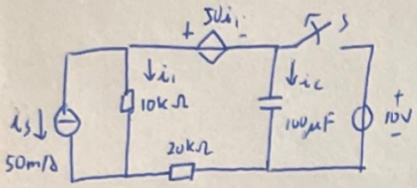
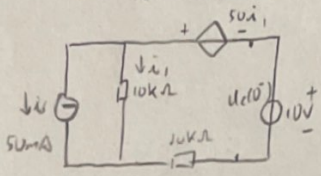
求 $i(0^+)$ 和 $u(0^+)$

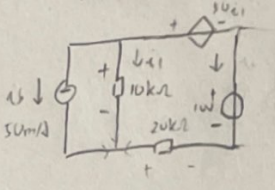


换路前稳态电路：



$u_c(0^-) = u_c(0^+) = 10V$

换路后稳态电路：



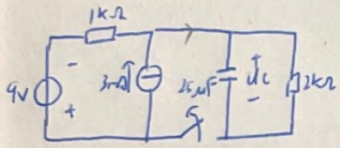
$10 = -50i_1(0^+) + i_1 \times 10\times10^3 + (50\times10^{-3} + i_1)\times 20\times10^3$

$i_1(0^+) = -33mA$

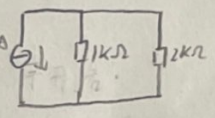
$u_1(0^+) = -33\times10^{-3}\times10\times10^{-3} = -330V$

$i_c(0^+) = 33 - 50 = -17mA$

求 $u_c(t)$，并定性画出其变化曲线。



$u_c(0^-)$：



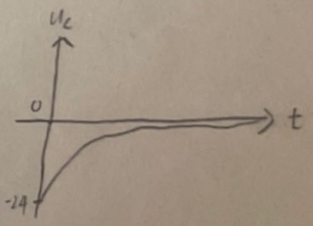
$u_c(0^-) = 6\times\frac{2}{1+2}\times1 = 4V$

$u_c(\infty)$：开并断开：$u_c(\infty) = 0$

$\tau = RC = 2000\times25\times10^{-6}$

$= 0.05s$

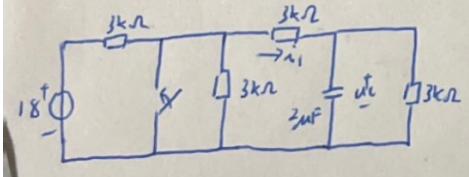
$u_c(t) = -4e^{-20t}$

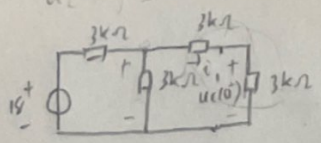


求 u_c 和 i_1 的零输入响应。

断开前：开 断

合前：电压 电流



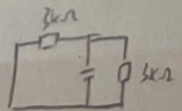


$u_c(0^-) = \frac{(3+3)\parallel3}{(3+3)\parallel3+3}\times18\times\frac{1}{2}$

$= 3.6V$

$u_c(0^+) = u_c(0^-) = 3.6V$

$i_1(0^+) = \frac{-3.6}{3000} = -1.2mA$



$\tau = RC$

$= 1500\times2\times10^{-6}$

$= 3\times10^{-3}(s)$

u_c 零输入响应：

$3.6e^{-333t}V$

i_1 零输入响应：

$-1.2e^{-333t}mA$