

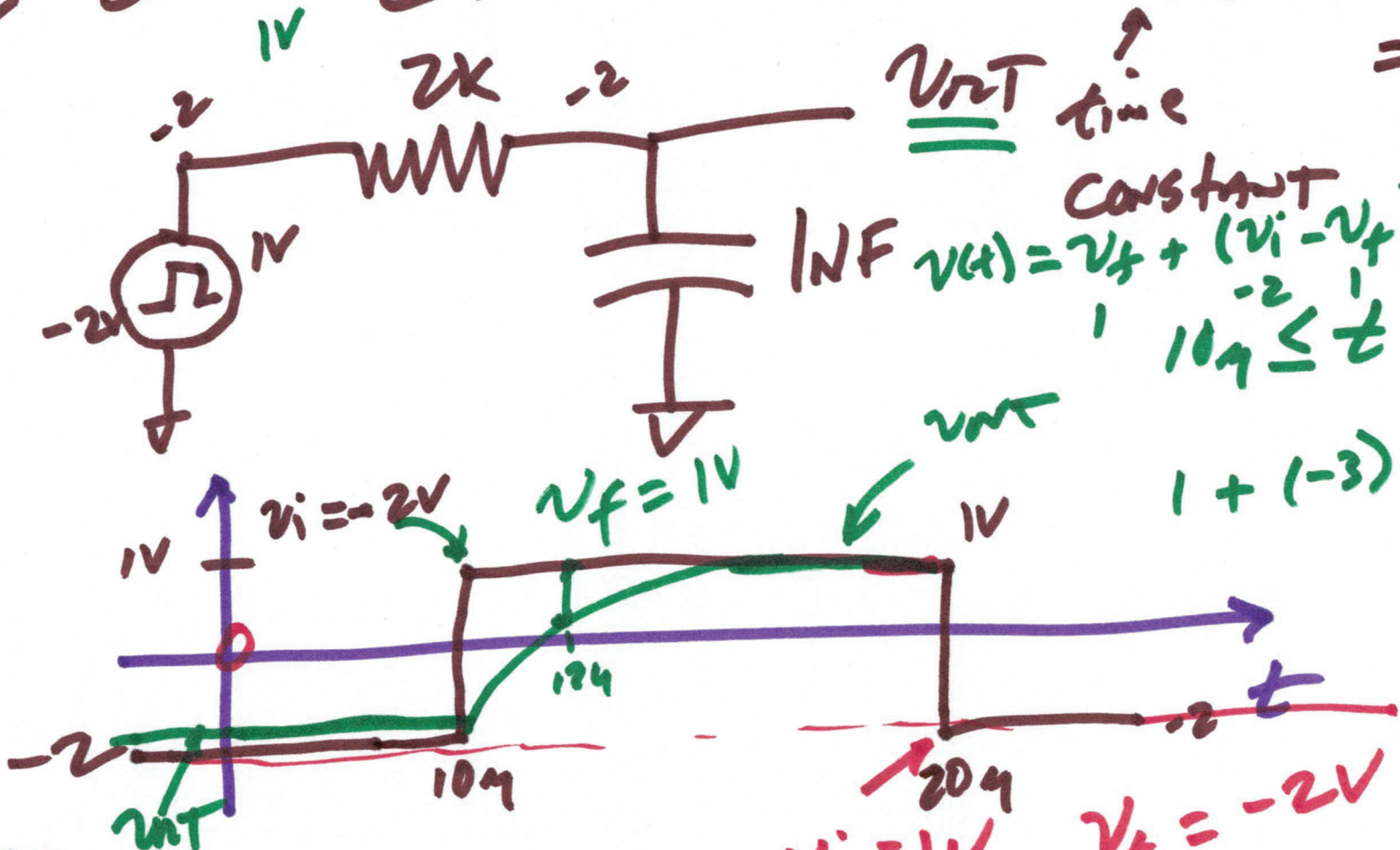
EE 220 circuits I

10/25/2023

Lecture 16

$$I = C \frac{dv}{dt}$$

$$\tau = RC = 2k \cdot 10^{-9} = 2 \mu s$$



v_{VT} time constant

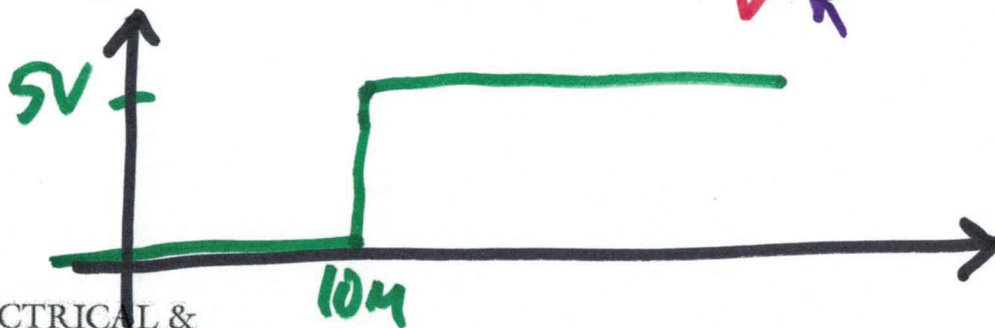
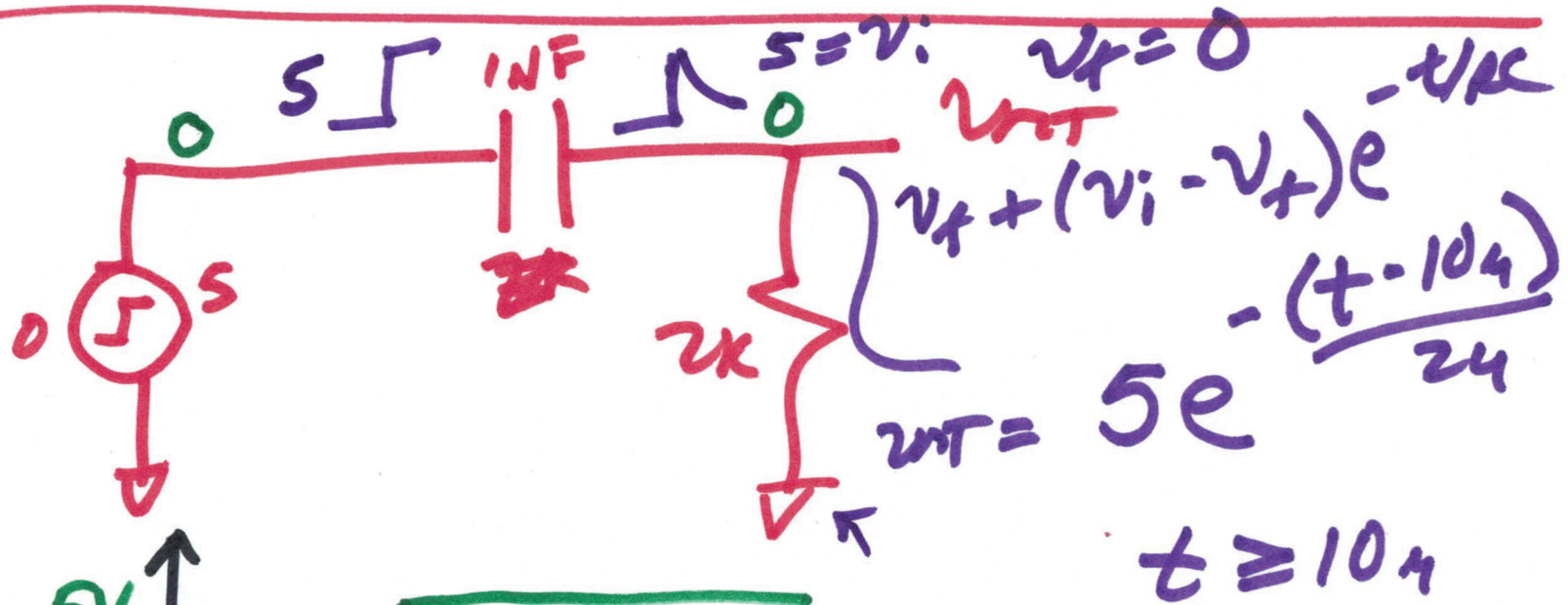
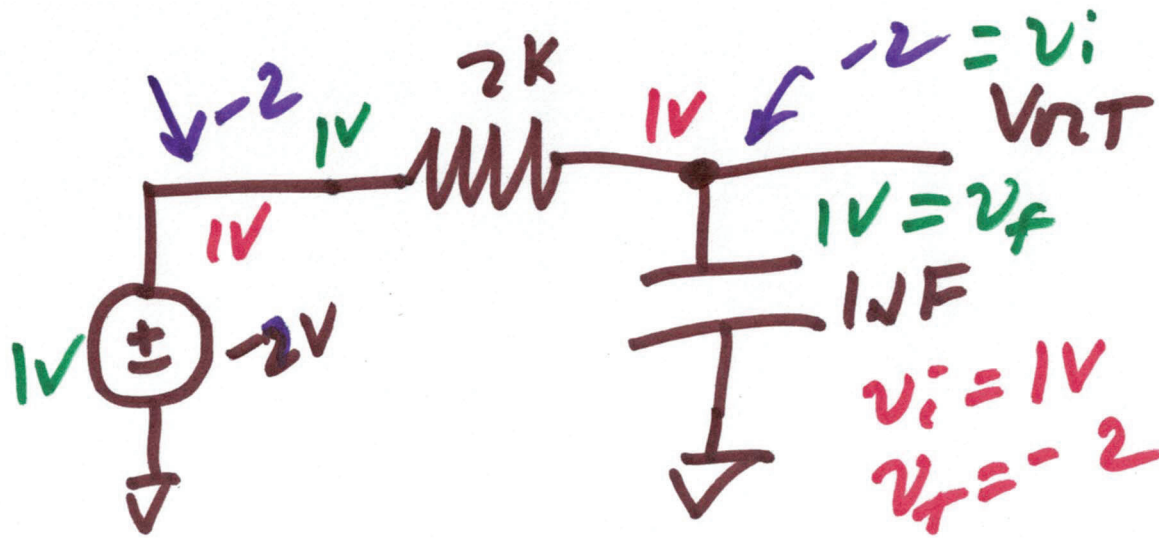
$$v(t) = v_f + (v_i - v_f) e^{-\frac{(t-10\mu)}{2\mu}}$$

$$10\mu \leq t \leq 20\mu$$

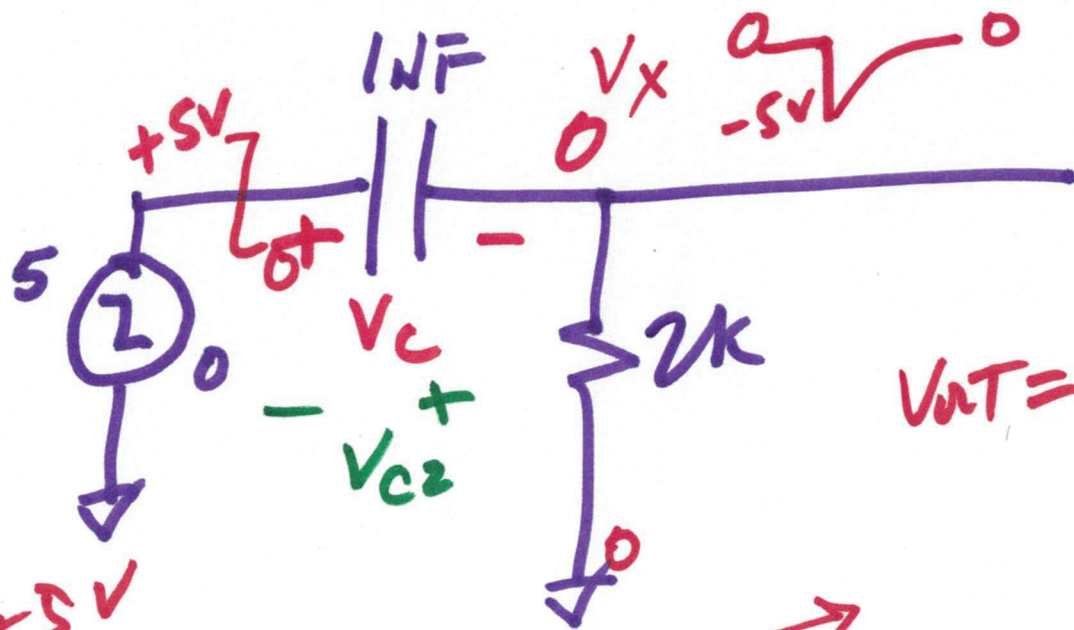
$$1 + (-3) e^{-\frac{(t-10\mu)}{2\mu}}$$

$v_i = 1V$ $v_f = -2V$

1)



2)



$$V_{out} = -5e^{-t/24}$$

F volts col
 $CV = Q$
 $I = C \frac{dV}{dt}$
 $V = \frac{1}{C} \int I \cdot dt$

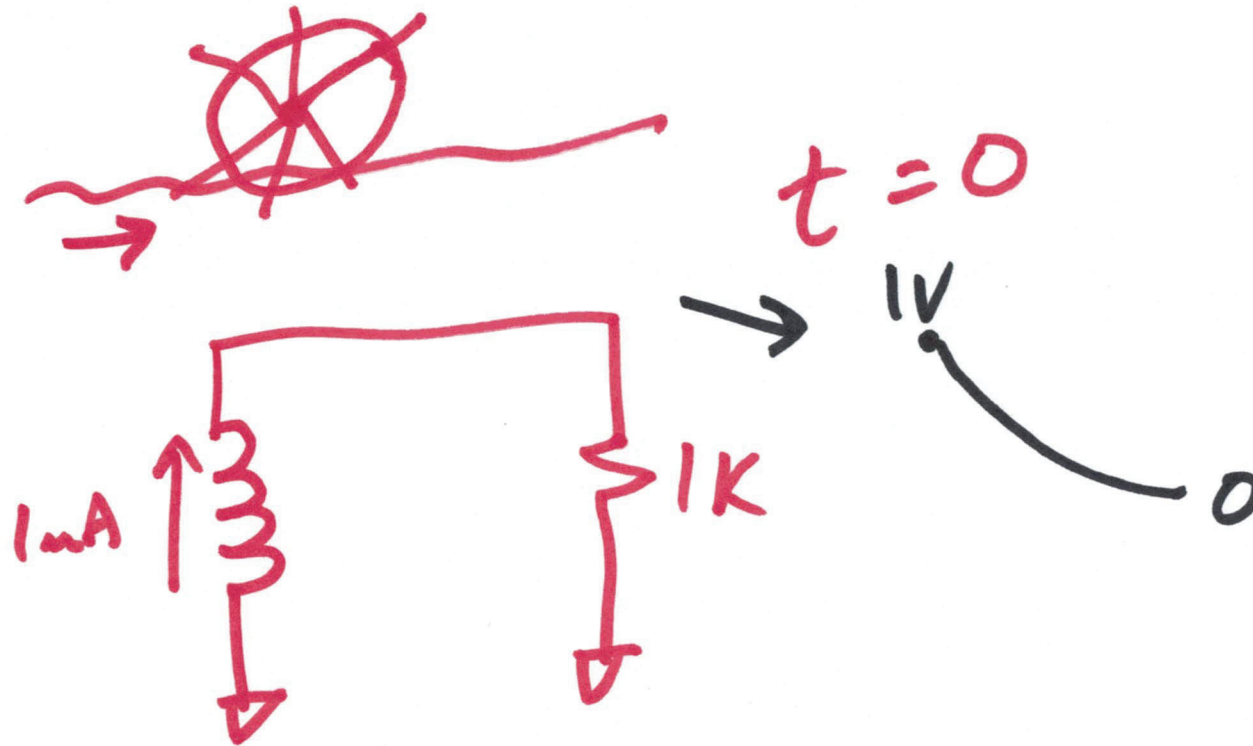
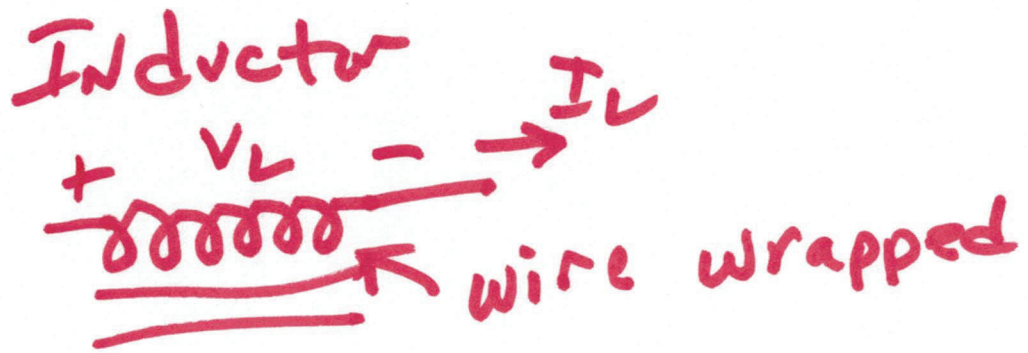
$$V_{c1} = 5 - 0 = +5V$$

$$V_{c2} = 0 - 5 = -5V$$

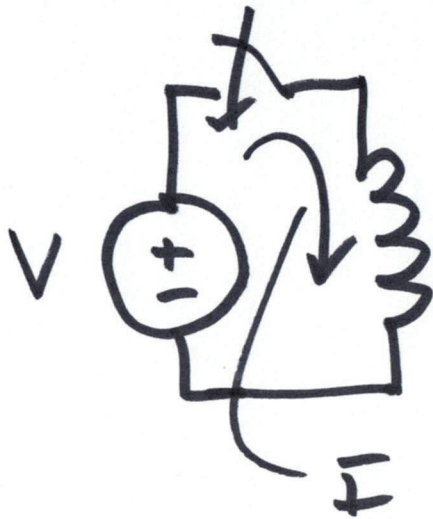
$$V_{c1} = 0 - V_x = 5V$$

$$V_x = -5$$

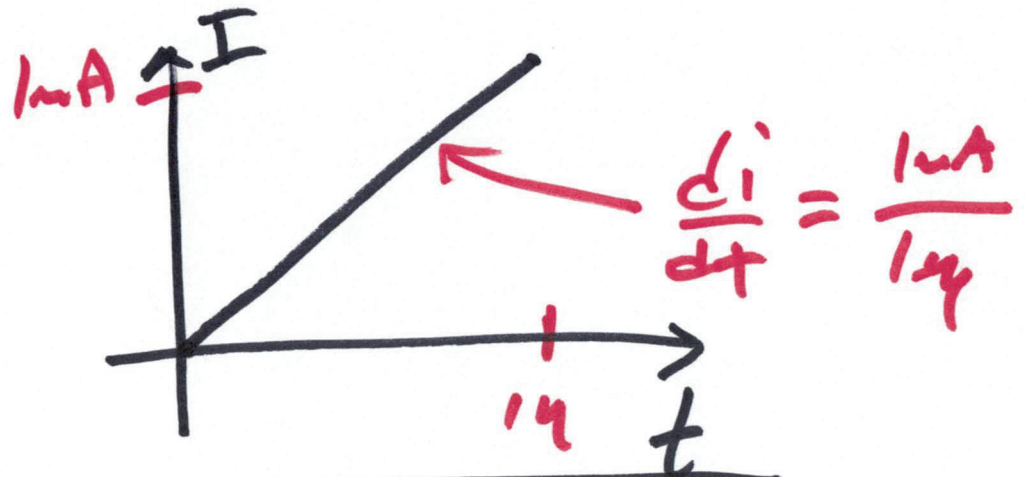
$$V_{c2} = V_x - 0 = -5V$$



4)



over a long time



$$V = L \cdot \frac{di}{dt}$$

↑
inductance

$$L = 14 \text{ H}$$

$$V = 14 \text{ H} \cdot \frac{1 \text{ mA}}{14}$$

$$V = 1 \text{ mV}$$