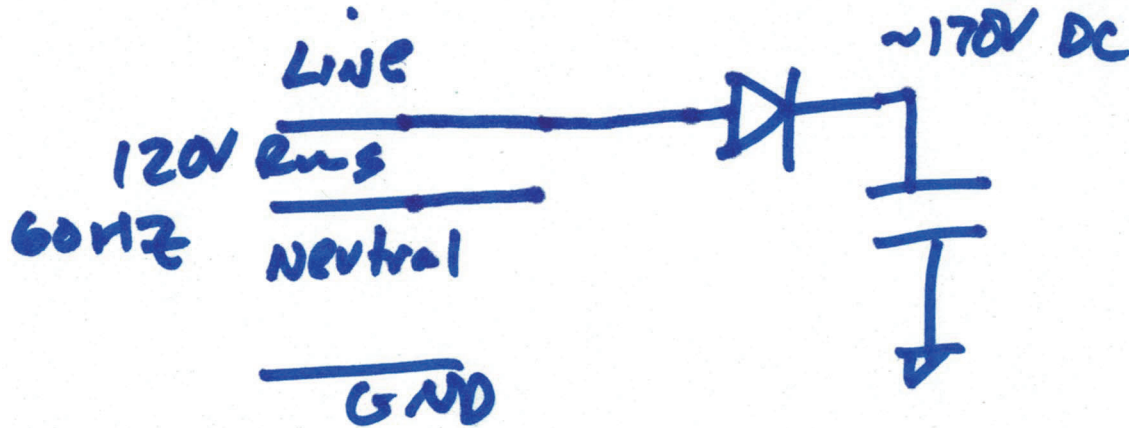


EE 421 / ECG 621

Digital IC Design

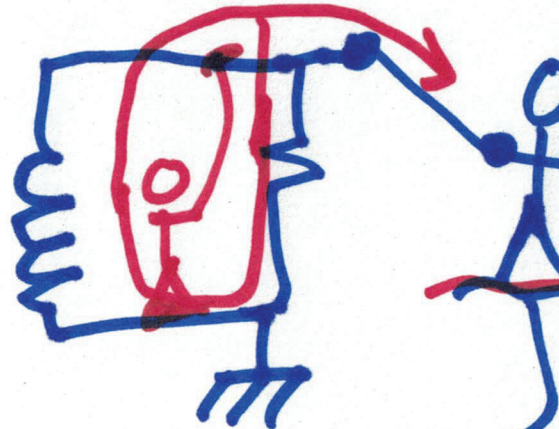
October 14, 2020

Lecture 14

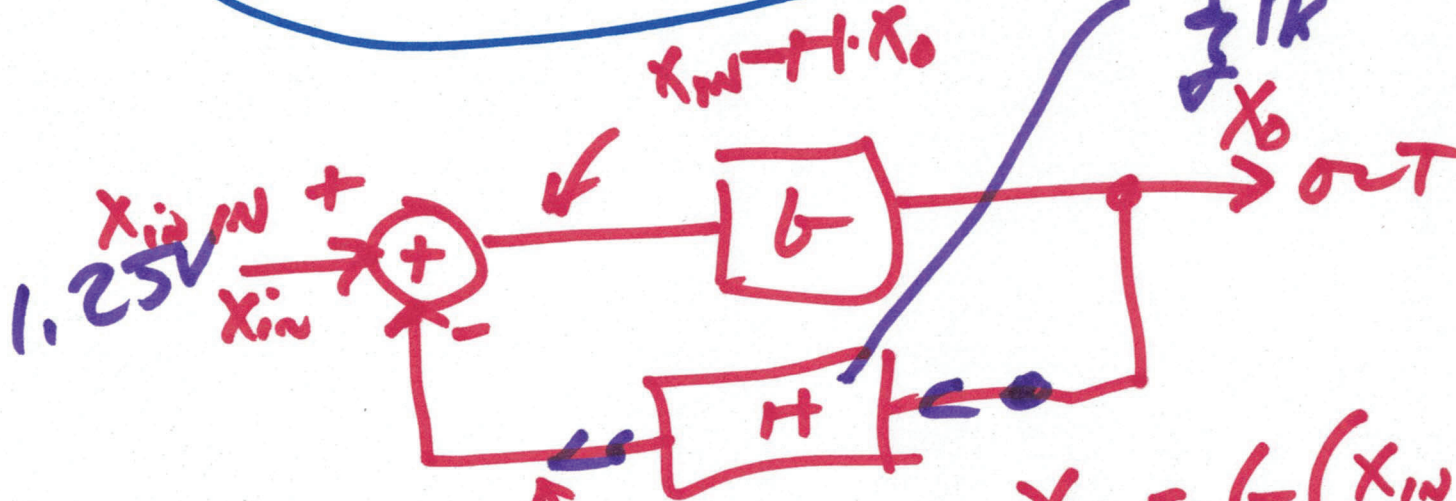
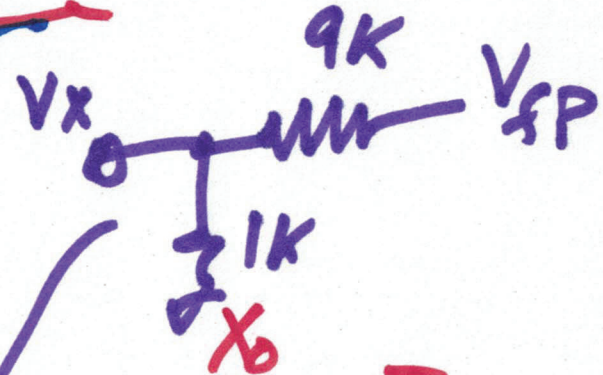


Off-line supply

Switching power supply
(SPS)



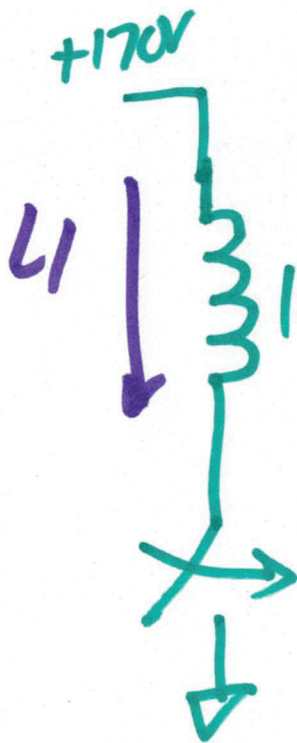
$$\frac{V_{SP}}{V_A} = H = \frac{1K}{1K+9K} = \frac{1}{10}$$



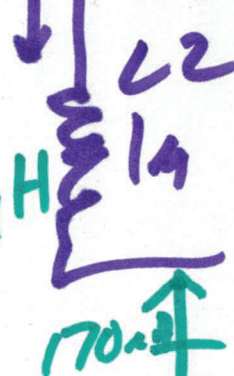
$$X_{out} = G(X_{in} - H X_{out})$$

$$10 = \frac{1}{H} \quad G \rightarrow \infty = \frac{1}{\frac{1}{G} + H} = \frac{X_{out}}{Y_{in}} = \frac{G}{1 + GH}$$

2)



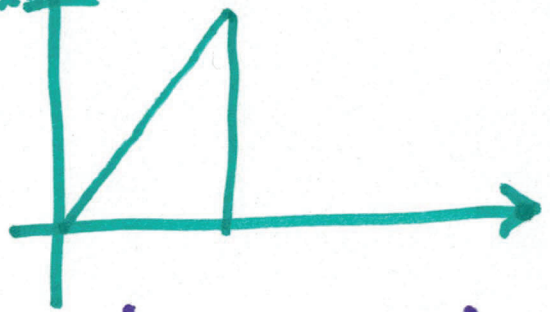
At $t=0$ switch closes



$$V = L \cdot \frac{di}{dt} \rightarrow \Delta i = \frac{V}{L} \cdot \Delta t$$

$$\Delta i = \frac{170}{100\text{m}} \cdot 100\text{ms}$$

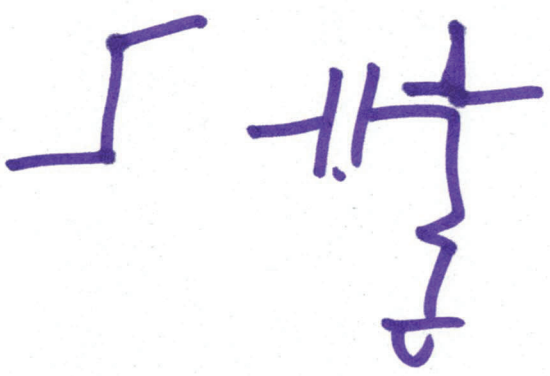
$$\Delta i = 170\text{mA}$$



$$\frac{i_2}{i_1} = \frac{N_1}{N_2} = \sqrt{\frac{L_2}{L_1}} = \sqrt{\frac{100}{1000}} = \frac{10}{31.6}$$

$$i_2 = i_1 \cdot 10$$

$$1.7\text{A} \cdot 10 = 17\text{A}$$



3)