ECE 5/472 Power Electronics

BOISE STATE UNIVERSITY

Lecture 41 Oct. 10, 2010

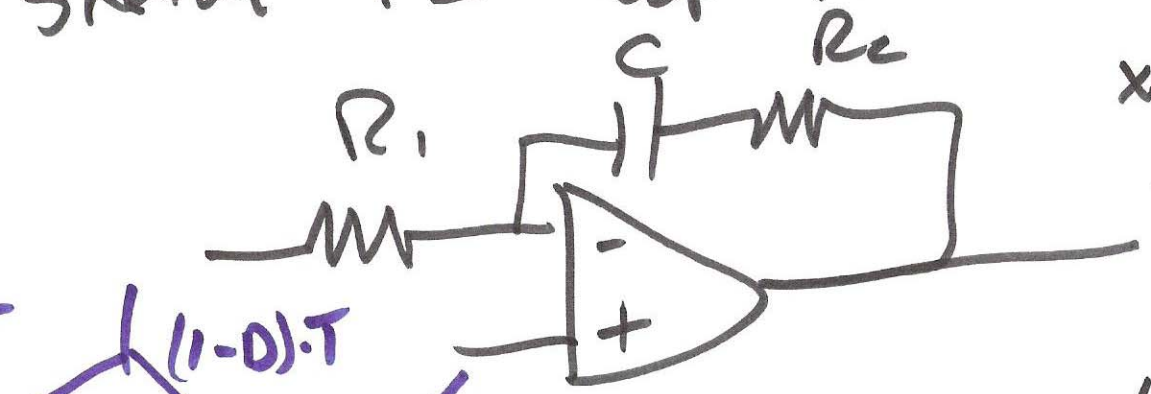
Review for the final

1) Know how to do all HW problems

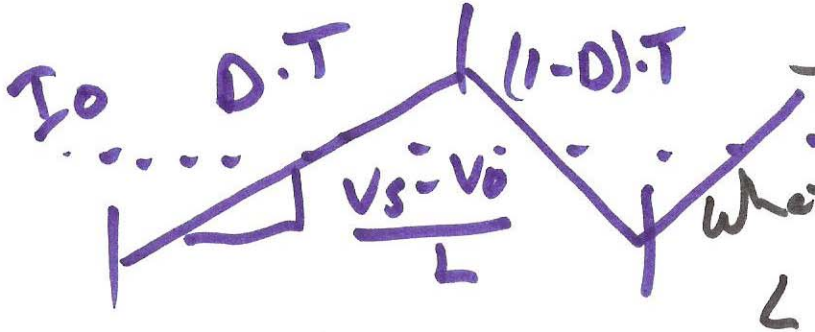
2) Know how to do problems on Tests 1 & 2

3) Project questions!

Sketch PI loop filter



xfer function
∴ cross-over freq.

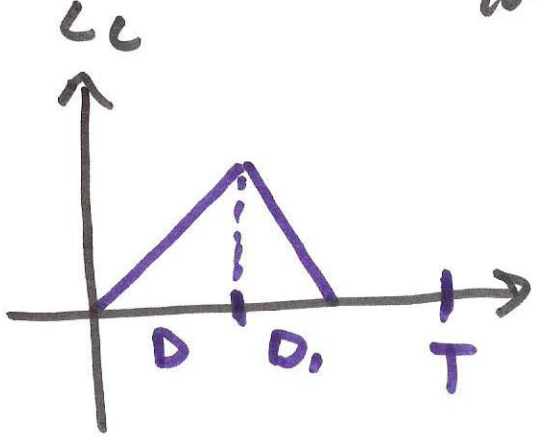


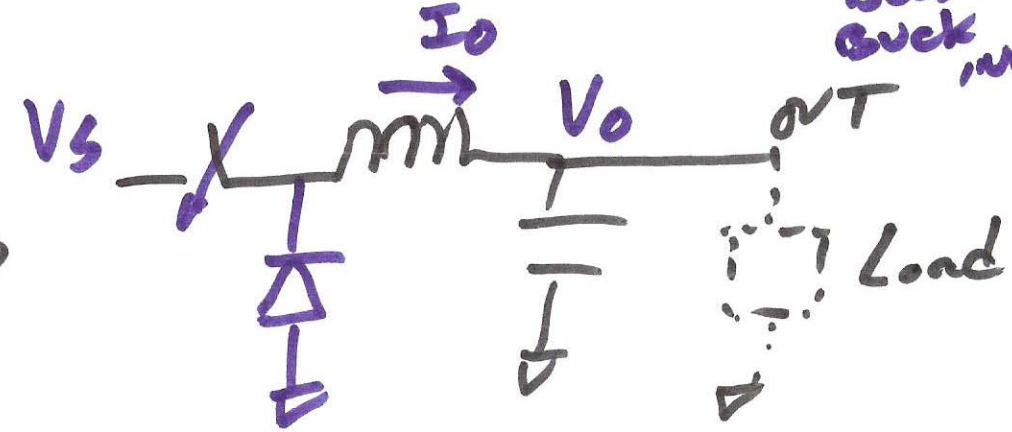
What sets L in a buck converter
switching & load

$L \propto \frac{R}{f_s}$

What sets C value

Buck-Boost
Cu'K
Boost
Buck
,etc.?





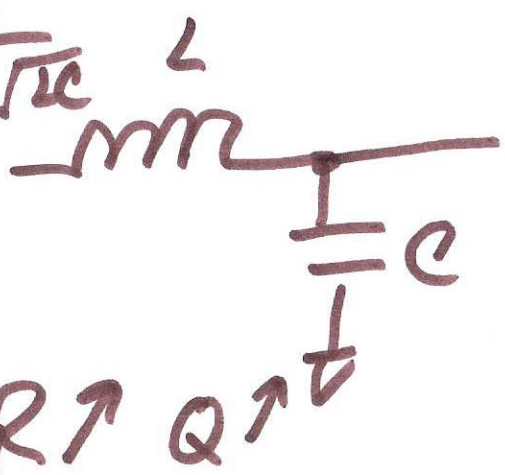
2)

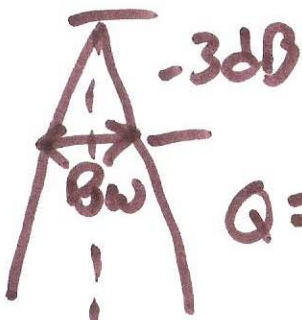
Projects cont'd

BOISE STATE UNIVERSITY

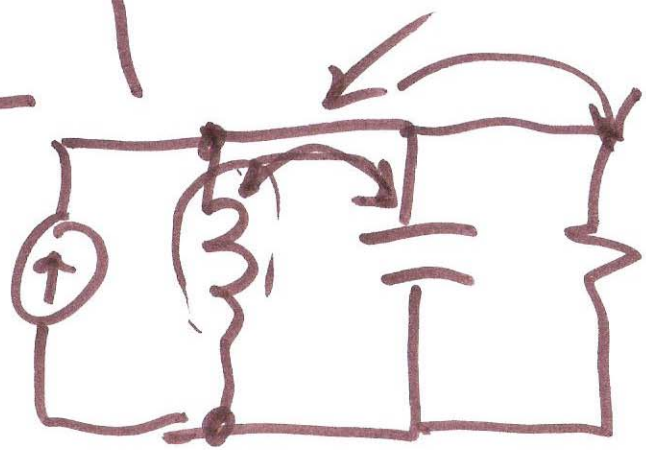
1) Determine $f_o = \frac{1}{2\pi\sqrt{LC}}$

2) zero at f_o





$Q = \frac{f_{center}}{Bw}$



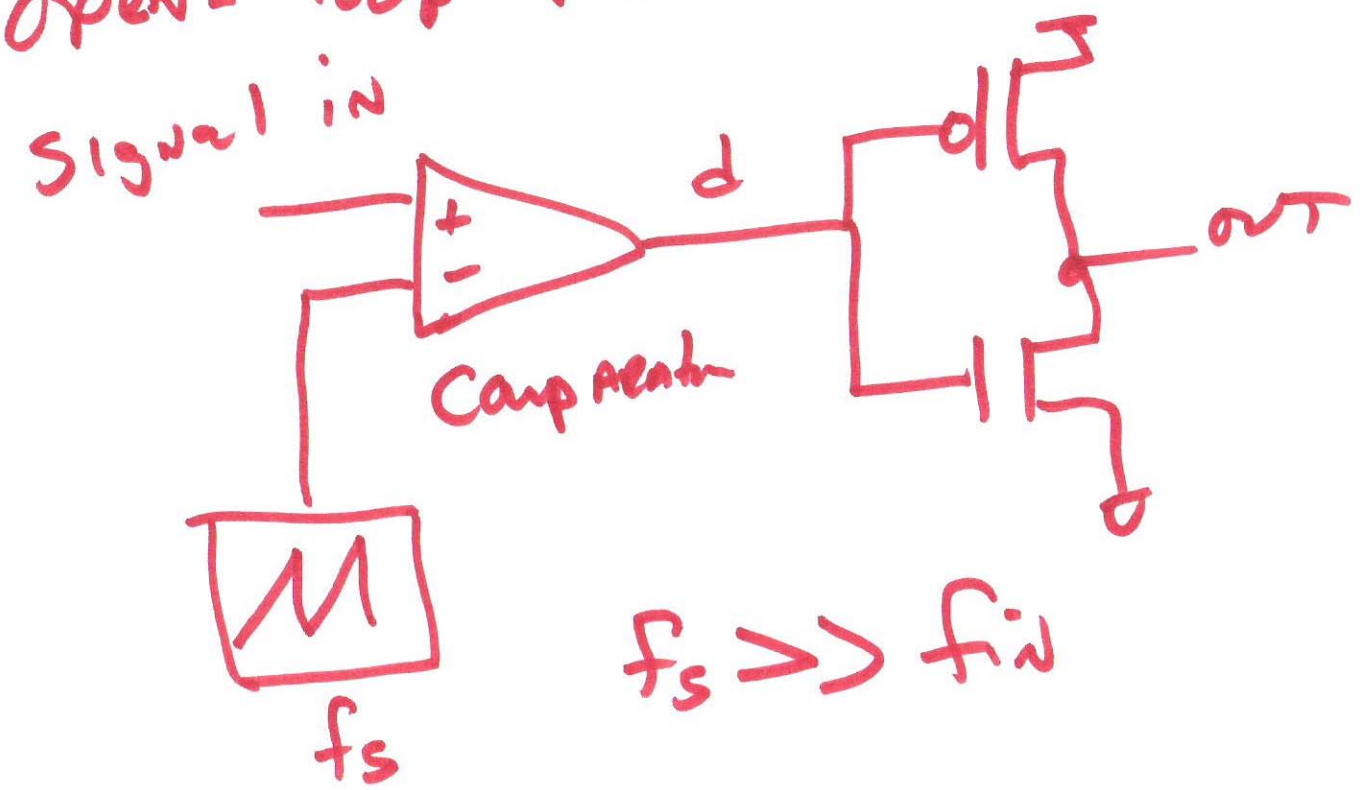
$Q = \frac{f_{center}}{\text{energy stored}}$

$Q = \frac{\text{energy stored}}{\text{energy lost}}$

3)

Sketch half-bridge
ZVS Buck converter
Non-overlapping clock generator

Open-loop PWM



→ Tests ←

→ H.W. ←

$L_2 = 100\,\mu H$

$N = 100$

$L_1 = \frac{100\,\mu H}{10K} = L_m$

$\frac{N_1}{N_2} = \sqrt{\frac{L_1}{L_2}} = \frac{1}{N}$ Charge pump operation

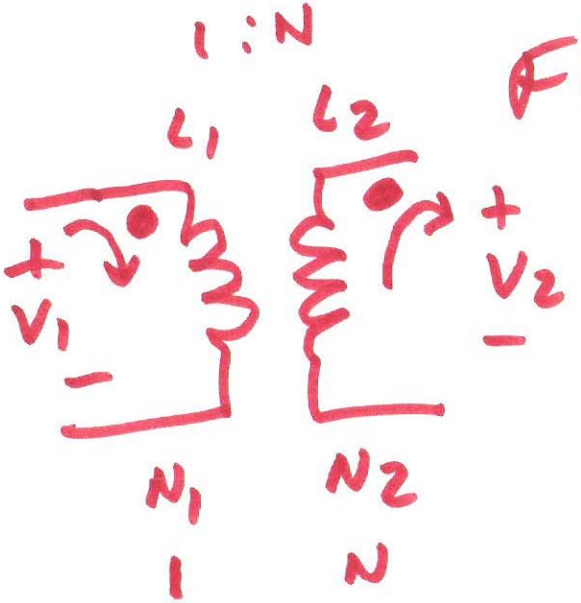
Topology stretch neg. V

Fly back converter C.P.

Magnetizing induct.

modeling / operation

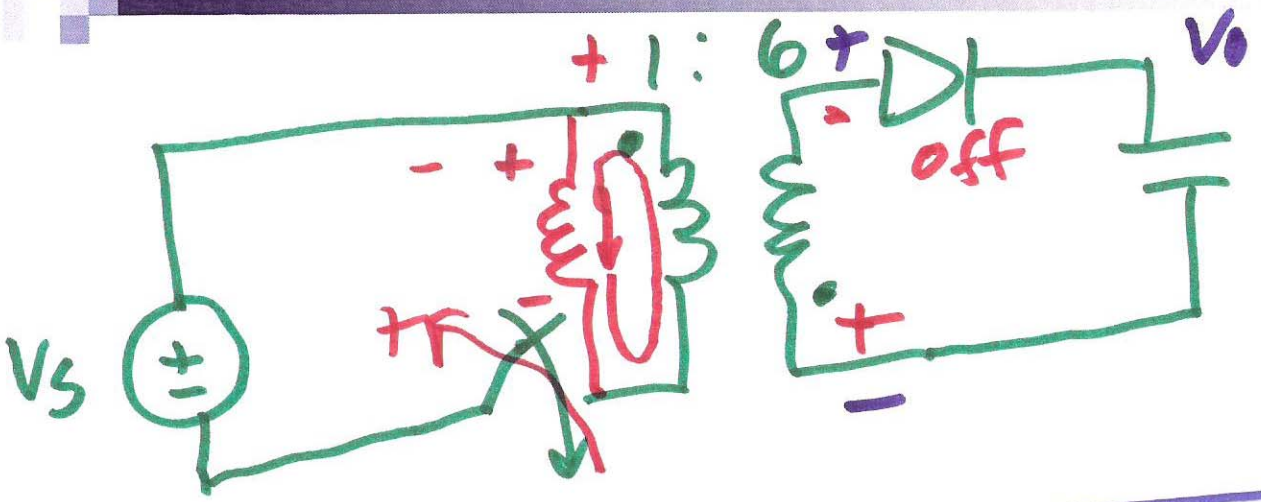
xfmrs.



$\frac{V_1}{V_2} = \frac{N_1}{N_2}$, $\frac{I_1}{I_2} = \frac{N_2}{N_1}$

5)

N1 N2



flyback
Buck
Boost
Buck-Boost
ZVS -

$$V_o = N V_1 - .7$$

$$V_1 = \frac{V_2}{N}$$

$$\frac{V_1}{V_2} = \frac{N_1}{N_2} = \frac{1}{N}$$

$$f_o = \frac{1}{\sqrt{LC}\cdot 2\pi}$$