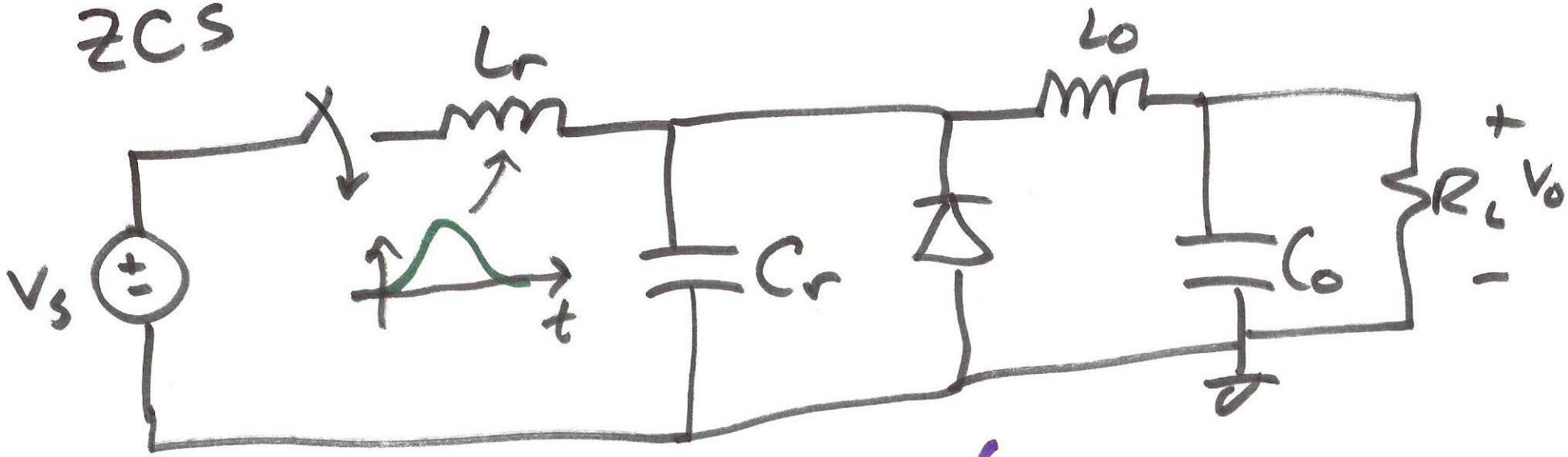
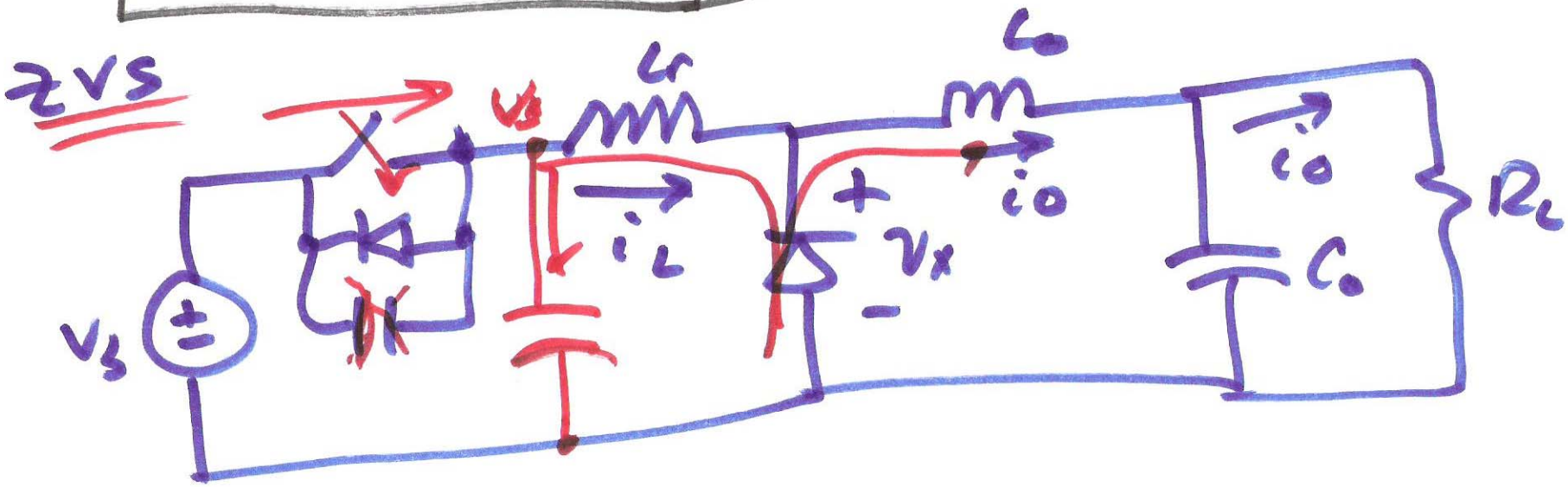
ECE 5/472 Power Electronics

BOISE STATE UNIVERSITY

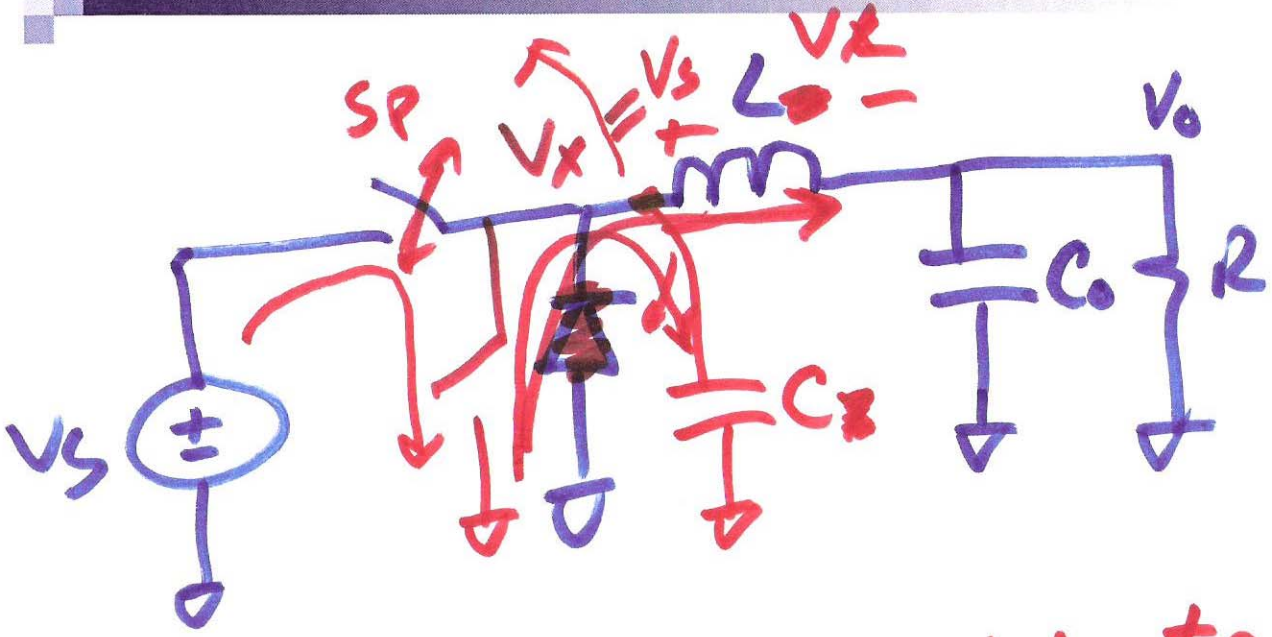
Oct. 4, 2011 Lecture





1)

Buck converter



$t_p + t_N < T$

Sp - closed switch t_p.

$$\frac{V_s - V_o}{L} = \frac{\Delta i_{Lp}}{t_p}$$

S_N - switch ■ closed t_N

$$\frac{0 - V_o}{L} = \frac{\Delta i_{LN}}{t_N}$$

Buck ZVS converter

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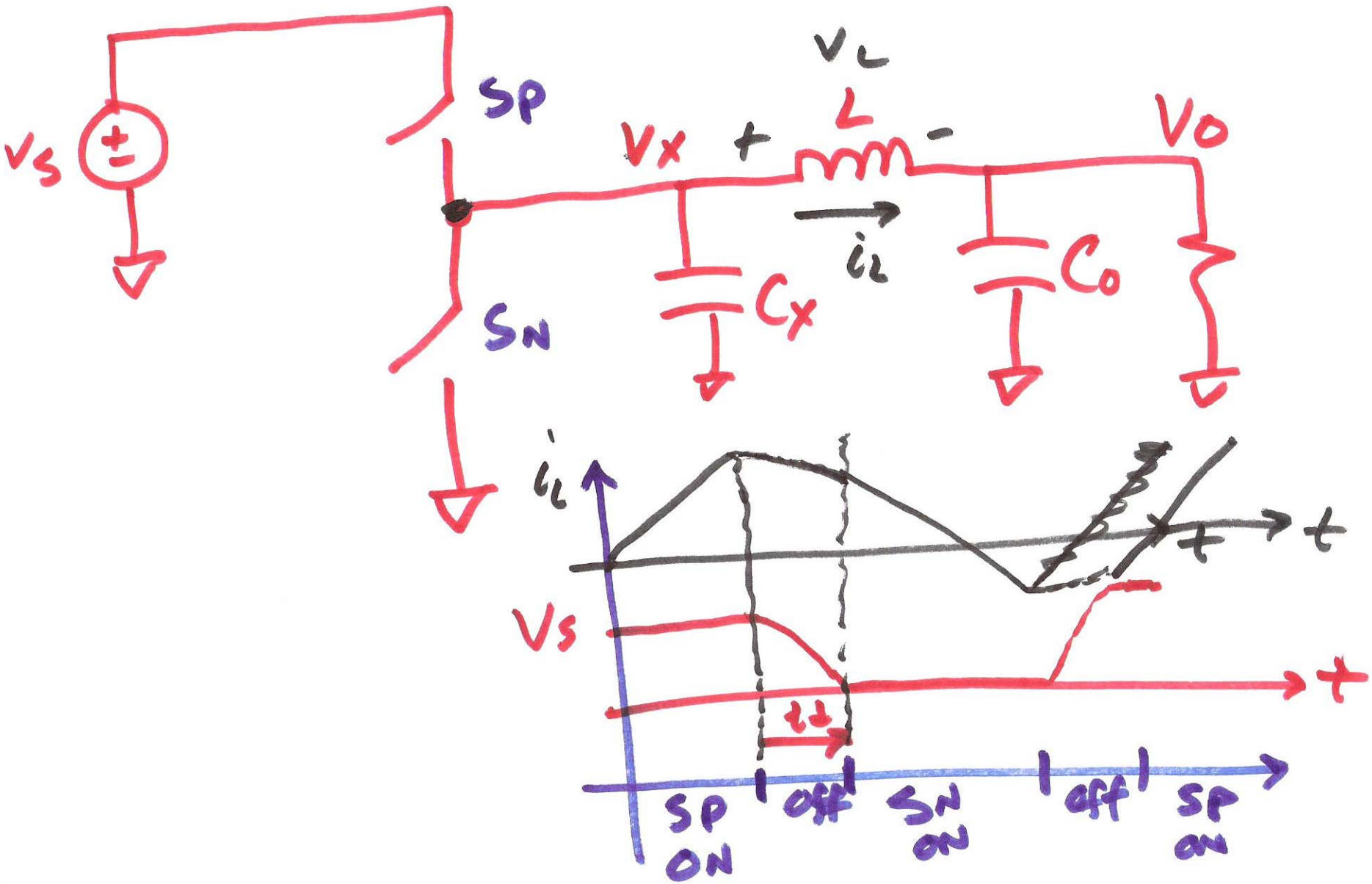
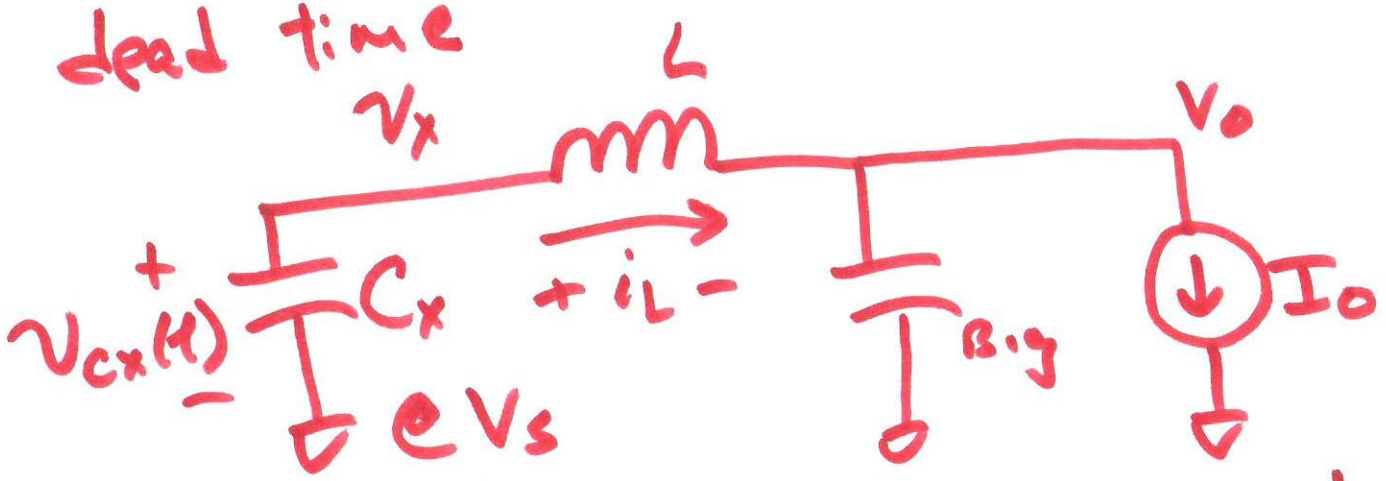


3)

If SP is closed

$$\frac{V_S - V_O}{L} = \frac{\Delta i_{LP}}{t_P}$$

dead time



$$v_{Cx}(t) = L\frac{di_L}{dt} + V_O = \frac{1}{C}\int_0^{t_{dt}} i_L \cdot dt + t_{c(t_0)}$$

$$\frac{dv_c}{dt} = L\frac{di_L}{dt^2} = \frac{i_L}{C}$$

4)

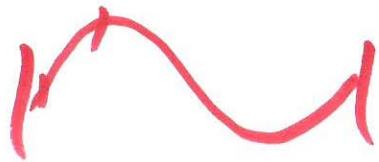
$$L\frac{d^2 i_L}{dt^2} = \frac{}{C}$$

$$f_0 = \frac{1}{2\pi\sqrt{LC}} = \frac{1}{T}$$

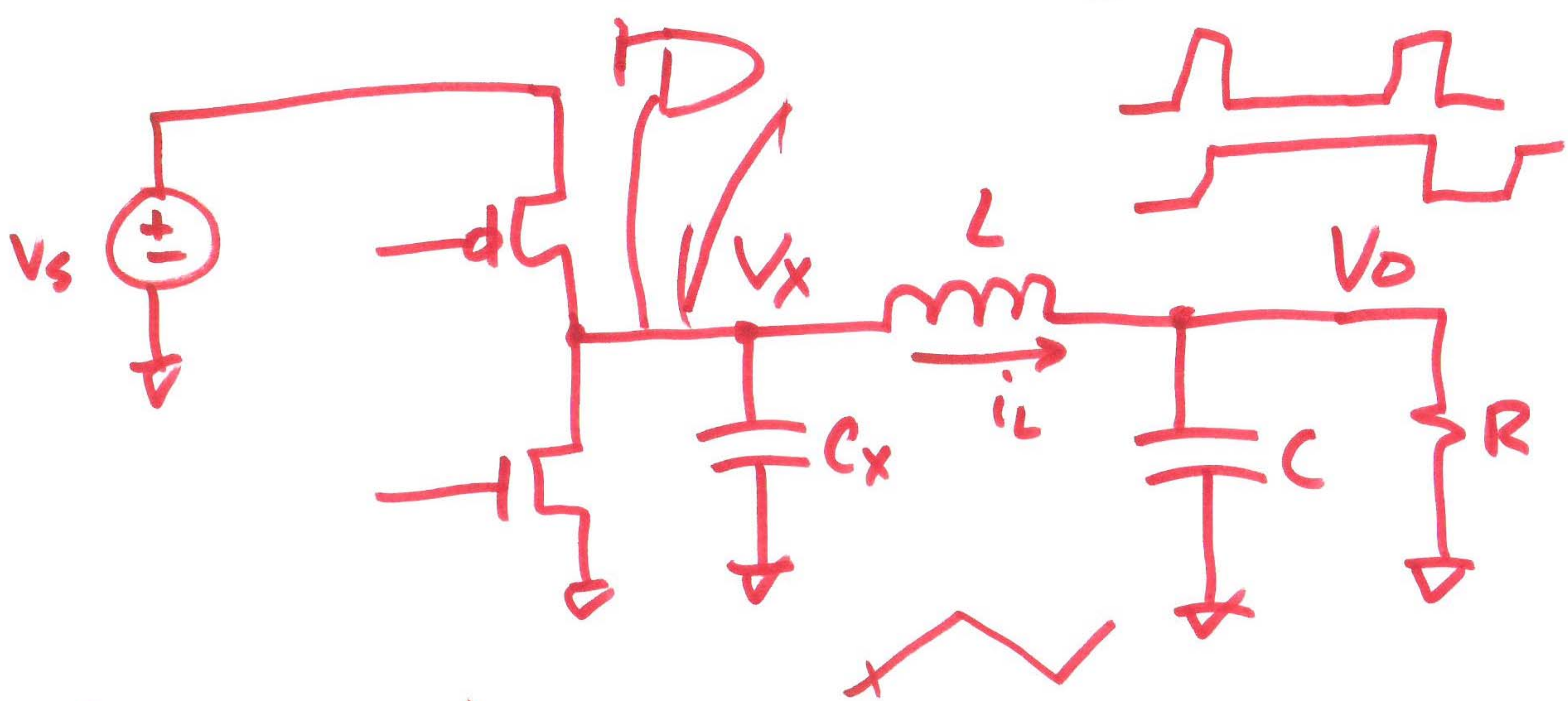
$$L = C = 10^{-6}$$

$$f_0 = 159 \text{ kHz}$$

$$6.28\,\mu s$$



ZVS



$V_o = D \cdot V_S$

6)