

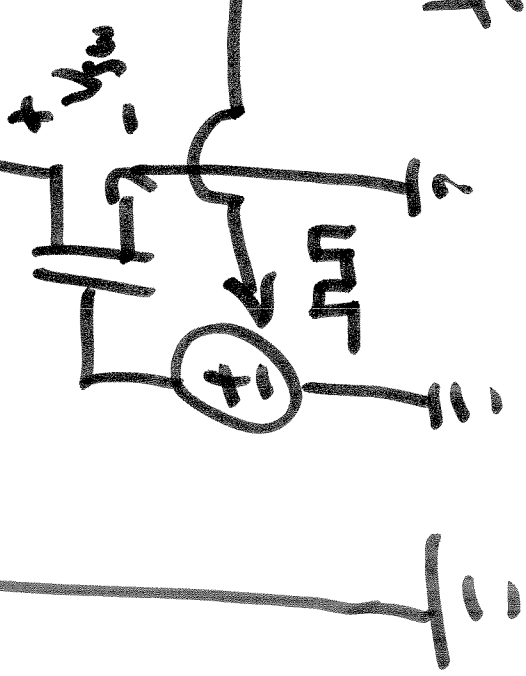
ECE 320 & ECE 329

ENERGY SYSTEMS I
BACKGROUND STUDY IN ENERGY SYSTEMS

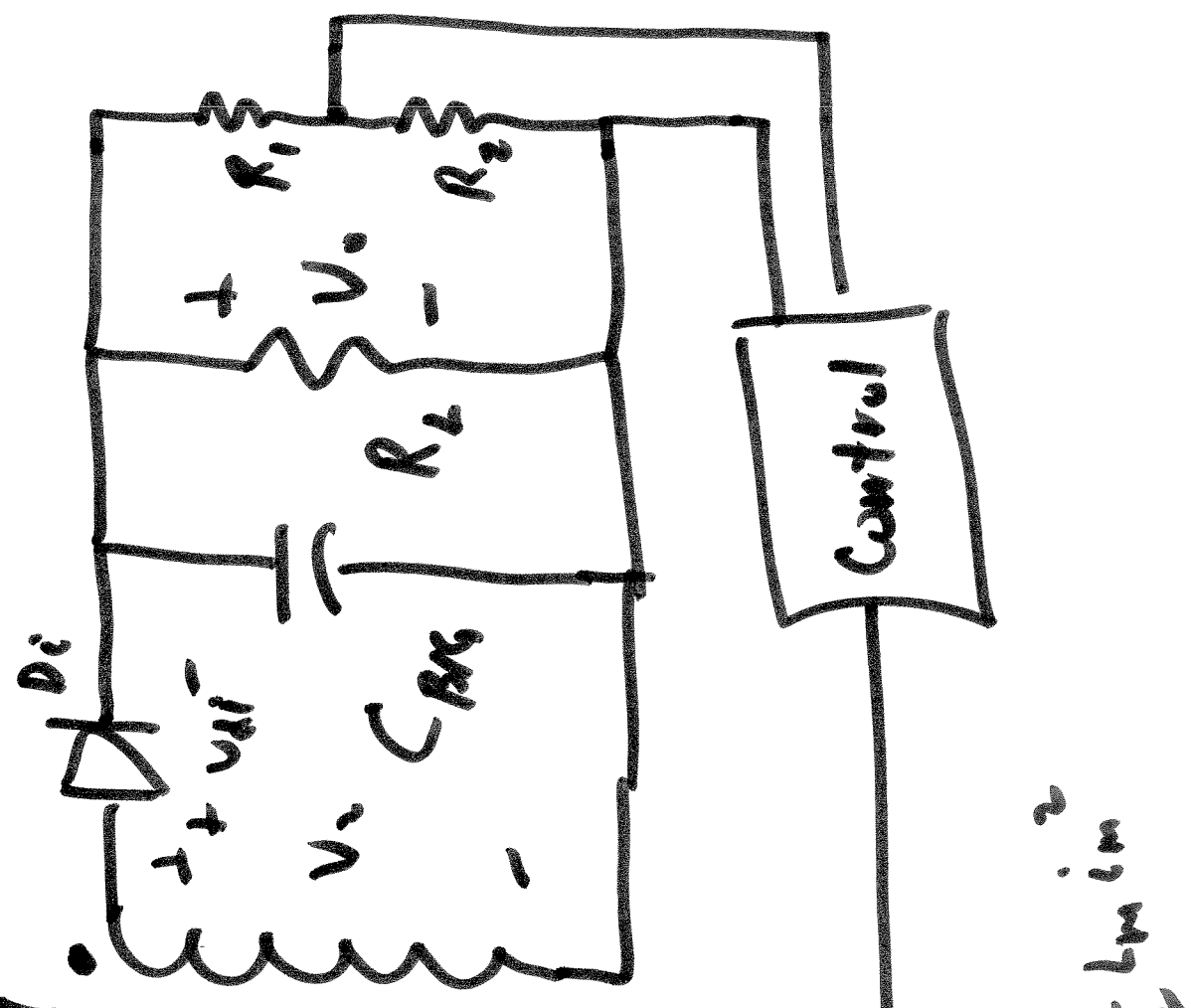
SESSION no. 36

$N:1$

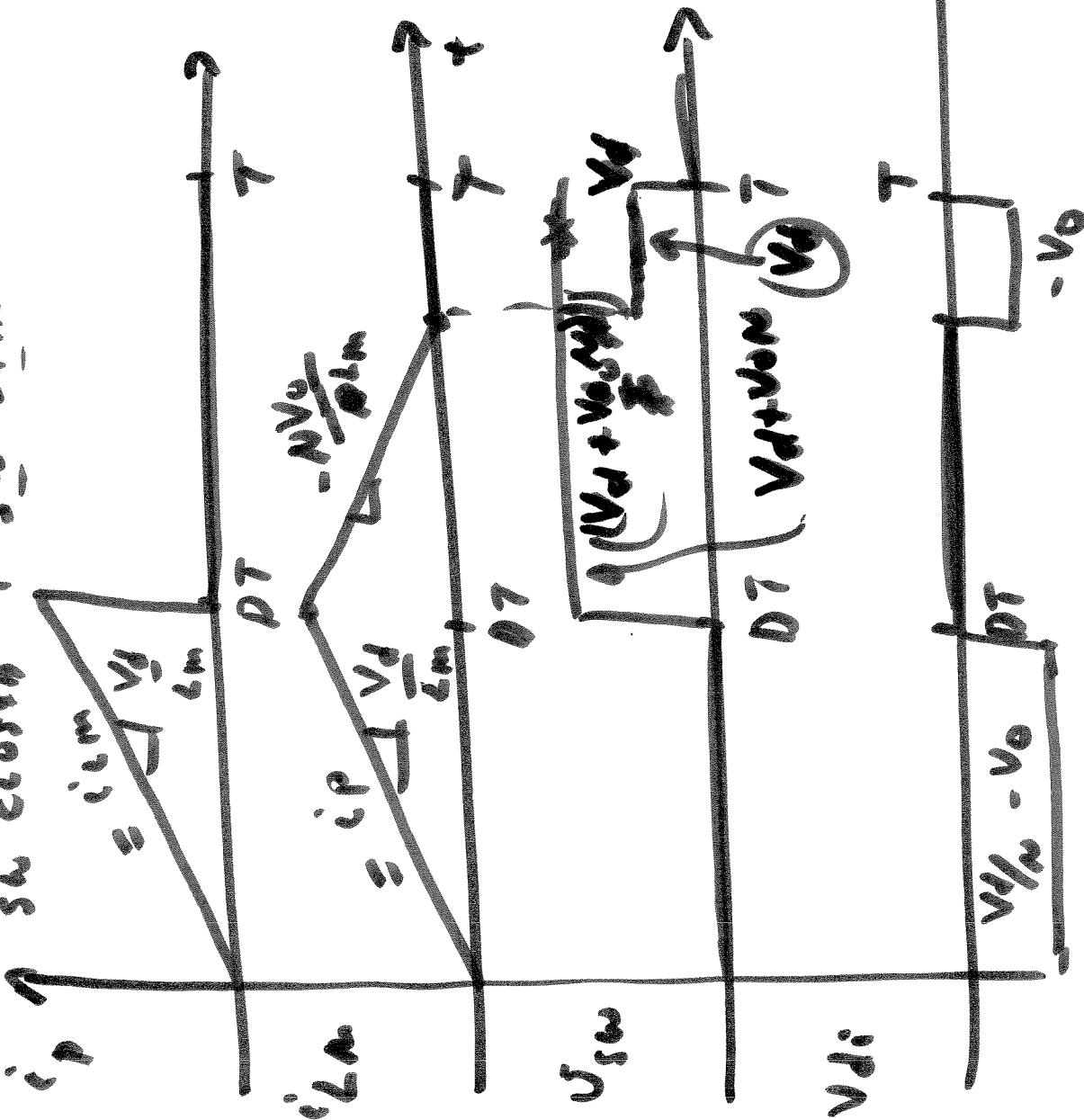
i_p



f_{Lm}^2



SW closed; SW open



$$V_o = V_i$$

$$\left(\frac{D}{1-D} \right)$$

$$\cdot \frac{1}{N}$$

$$\frac{V_0}{V_i} = \left(\frac{D}{1-D} \right)^{\frac{1}{N}}$$

EXAM 2

FLY BACK

CONVERTER

$$V_d = 170V \quad D = 0.40 \quad N = 5$$

$$R_L = 20\Omega \quad L_m = 600\mu H \quad C_{BUC} = 10\mu F$$

$$f_s = 300kHz \quad T_s = \frac{1}{f_s} = 3.33\mu s$$

CONTINUOUS CONDUCTION. FIND V_o , i_{di}

$$V_o = \frac{P}{1-D} \cdot \frac{1}{A} \cdot V_d$$

$$V_o = \frac{0.40}{1-0.40} \cdot \frac{1}{5} \cdot 170V = \underline{\underline{22.7V}}$$

$$I_o = \frac{V_o}{R_L} = \frac{22.7V}{20\Omega} = 1.13 A$$

$$\Delta I_d = \frac{V_s}{L_m} \cdot D \cdot T_s = \frac{170V}{600\mu H} \cdot (0.40) \cdot (3.33\mu s)$$

$$\Delta I_d = 0.378 A$$

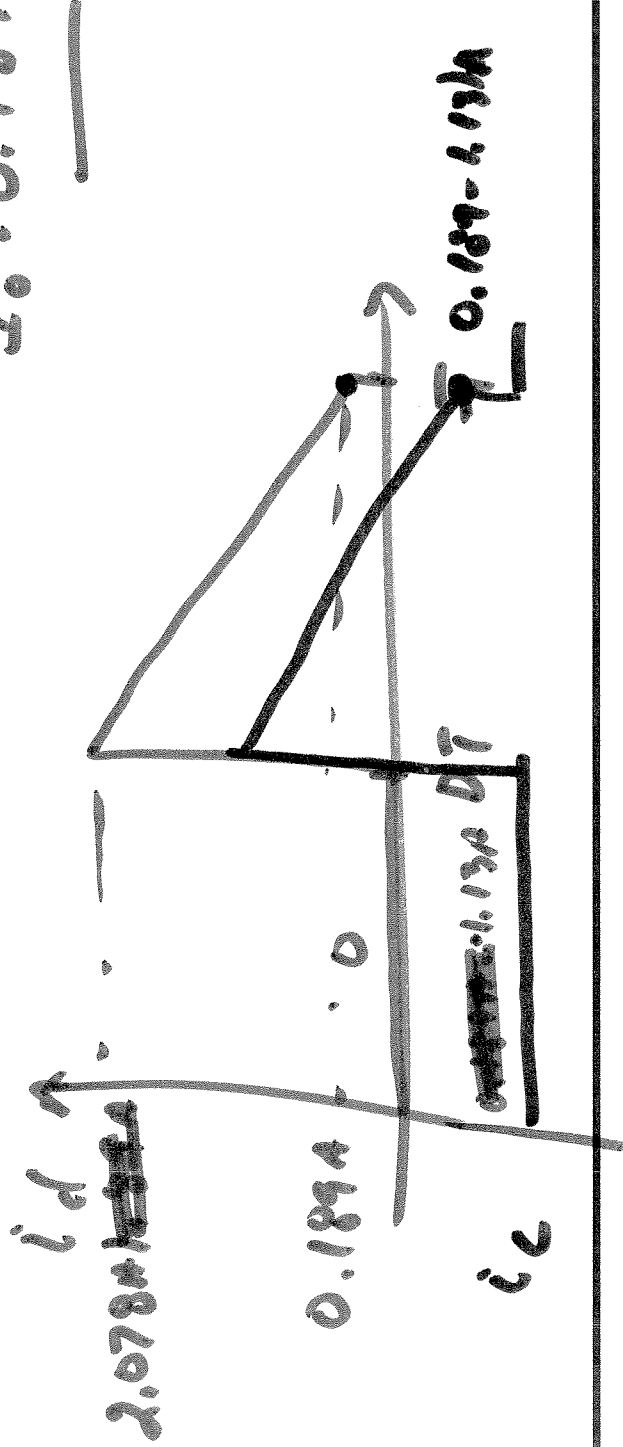
$$b) I_0 = N \cdot I_d = (5)(0.378A)$$

$$\Delta I_0 = 1.89A$$

$$I_{0max} = I_0 + \frac{\Delta I_0}{2} = 1.13A + \frac{1.89A}{2}$$

$$I_{0max} = \underline{2.078A} \quad I_{0min} = I_0 - \frac{\Delta I_0}{2}$$

$$I_0 = 0.189A$$



ECE 320 / ECE 329

Energy Systems I

Lesson 36

Flyback and Forward
Converters

Flyback:

*Applications <100 Watts

*Simplicity (isolation with low
cost)