

Problem 5-8

u from Eq. 5-32:

$$\cos u = 1 - \frac{2\omega L_s}{\sqrt{2}V_s} I_d$$

$$\therefore u = 0.3 \text{ rad} = 17.14 \text{ deg}$$

V_d from Eq. 5-33

$$V_d = 0.9V_s - \frac{2\omega L_s}{\pi} I_d = 105.6 \text{ V}$$

$$P_d = V_d I_d = 1056 \text{ W}$$

$$\text{drop } \Delta V_d \% = \frac{V_{do} - V_d}{V_{do}} \times 100 = 2.22\%$$

$$\text{where } V_{do} = 0.9V_s$$