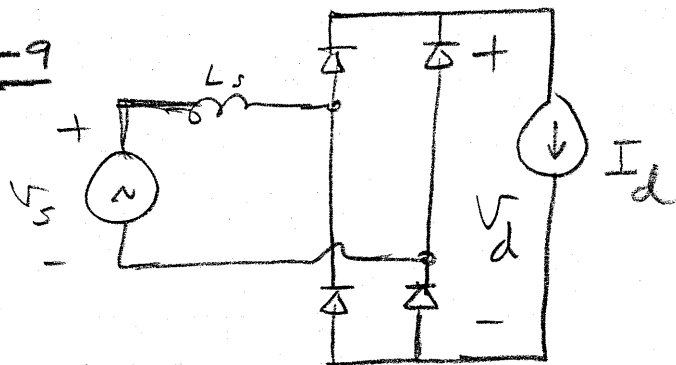
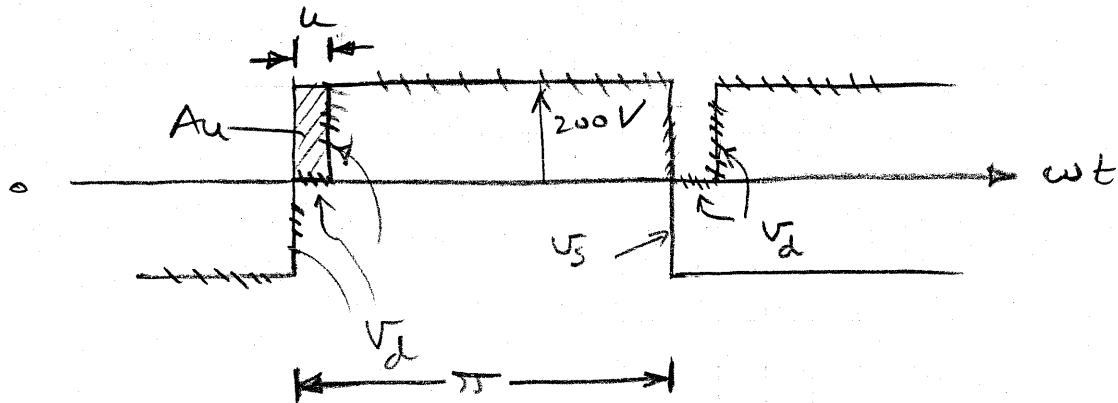


Problem 5-9



(a)



5-12

$$A_u = 200 u = 2 \omega L_s I_d$$

$$\therefore u = \frac{2 \omega L_s I_d}{200} \text{ rad} = 0.0377 \text{ rad} = 2.16 \text{ deg}$$

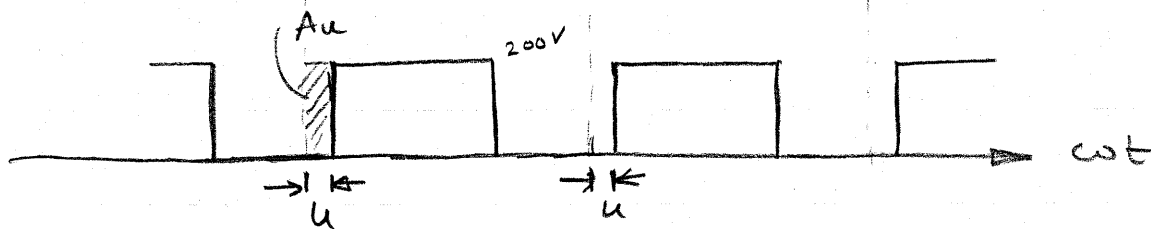
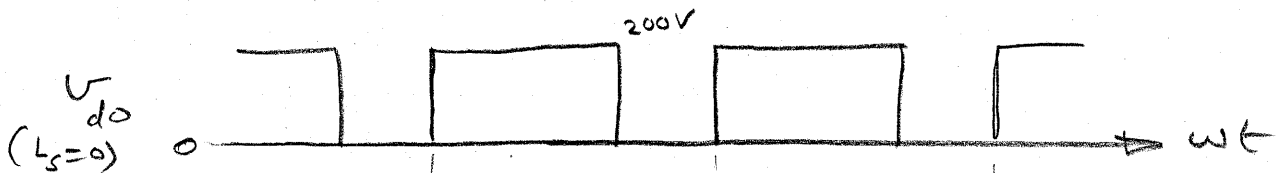
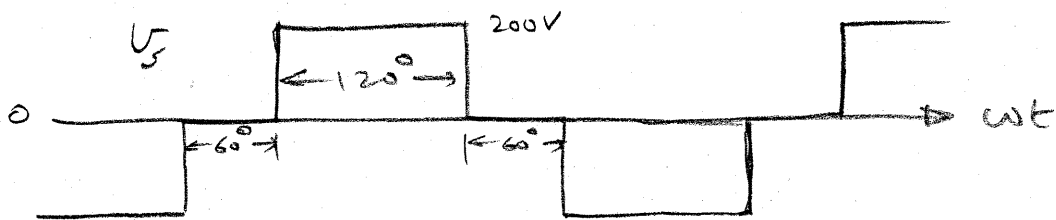
$$V_{do} = 200 \text{ V}$$

$$V_d = V_{do} - \frac{A_u}{\pi} = 200 - \frac{2 \omega L_s I_d}{\pi} = 197.6$$

$$P_d = V_d I_d = 1976 \text{ W}$$

$$\text{drop } \Delta V_d \% = \frac{V_{do} - V_d}{V_{do}} \times 100 = 1.2 \%$$

(b)



$$V_{do} = 200 \times \frac{120}{180} = 133.33 \text{ V}$$

$$A_u = 200 u = 2 \omega L_s I_d$$

$$u = \frac{2 \omega L_s I_d}{200} \text{ rad} = 0.0377 \text{ rad} = 2.16 \text{ deg}$$

$$V_d = V_{do} - \frac{A_u}{\pi} = 133.33 - \frac{2 \omega L_s I_d}{\pi} = 130.93 \text{ V}$$

$$P_d = V_d I_d = 1309.3 \text{ W}$$

$$\text{drop } \Delta V_d \% = 1.8 \%$$