

Problem 6-18

$$V_d = 1.35 V_{LL} \cos \alpha - \frac{3 \omega L_s}{\pi} I_d = -550 \text{ V}$$

$$P_d = E_d I_d = 550 I_d = 55 \times 10^3$$

$$\therefore I_d = 100 \text{ A}$$

\therefore In the above equation:

$$1.35 V_{LL} \cos \alpha = -550 + 18 = -532 \text{ V}$$

$$\therefore \alpha \approx 145^\circ$$

$$\cos(\alpha + u) = \cos \alpha - \frac{2 \omega L_s}{\sqrt{2} V_{LL}} I_d$$

$$= -0.857 - 0.058 = -0.915$$

$$\therefore \alpha + u = 156.2^\circ$$

$$\therefore \gamma = 180 - (\alpha + u)$$

$$= 23.8^\circ$$