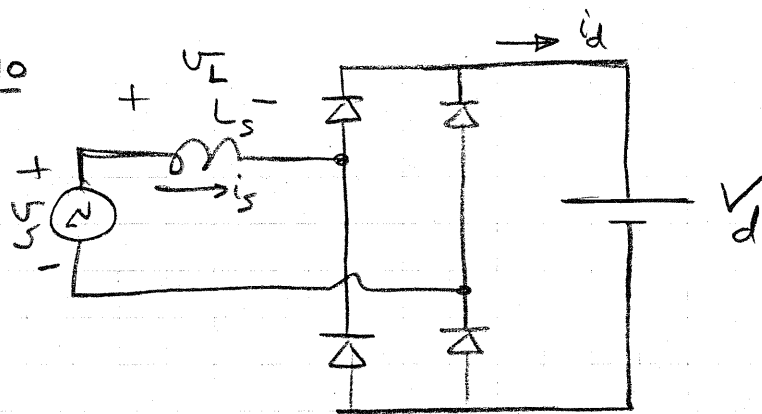
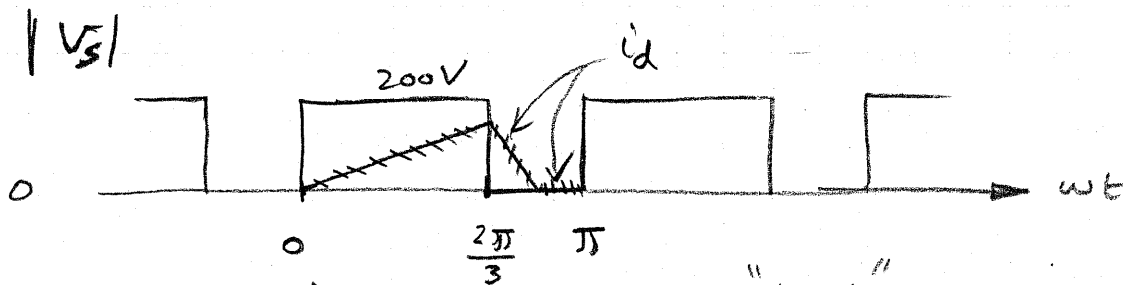


Problem 5-10



$$\omega = 2\pi f = 377 \frac{\text{rad}}{\text{s}}$$



$$i_d(0) = 0 \quad \leftarrow \text{See "Hint"}$$

$$0 < \omega t < \frac{2\pi}{3} \quad L_s \frac{di_d}{dt} = 200 - 160 = 40$$

$$\therefore \frac{di_d}{d(\omega t)} = \frac{40}{\omega L_s} = \frac{40}{377 \times 10^{-3}}$$

$$i_d(\omega t = \frac{2\pi}{3}) = \frac{40 \times (2\pi/3)}{377 \times 10^{-3}} = 222.2 \text{ A}$$

$$\omega t > \frac{2\pi}{3}$$

$$L_s \frac{di_d}{dt} = -160$$

$$\therefore \frac{di_d}{d(\omega t)} = -\frac{160}{377 \times 10^{-3}} = -424.4 \frac{\text{A}}{\text{rad}}$$

$\therefore i_d$ comes down to zero in

$$\frac{222.2}{424.4} = 0.523 \text{ rad} \approx 30^\circ$$

and it stays ^{at} zero until $\omega t = \pi$.