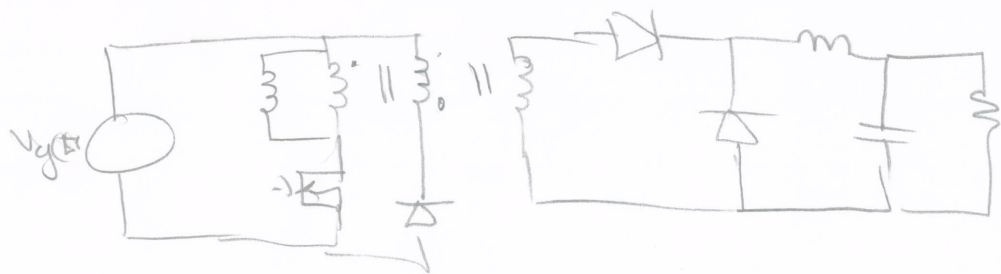


8.22



$$\langle V_{km} \rangle = V_g d_1 - V_g d_2 + 0$$

$$L \frac{d\langle i_L \rangle}{dt} = \langle V_L \rangle = \frac{n_3}{n_1} V_g D - V = \frac{n_3}{n_1} [(V_g + \hat{V}_g)(D + \hat{D}) - V + \hat{V}]$$

$$0 = \frac{n_3}{n_1} V_g D - V$$

$$L \frac{d\hat{V}}{dt} = \frac{n_3}{n_1} [\hat{V}_g D + V_g \hat{D}] - \hat{V}$$

$$C \frac{d\langle v \rangle}{dt} = \langle i_C \rangle = i_L - \frac{V}{R} = I_L + \hat{i}_L - \frac{\hat{V} + V}{R}$$

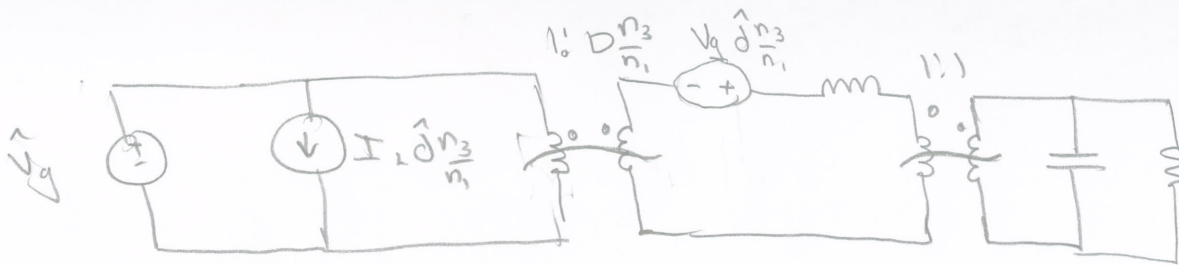
$$0 = I_L - \frac{V}{R}$$

$$C \frac{d\hat{V}}{dt} = \hat{i}_L - \frac{\hat{V}}{R}$$

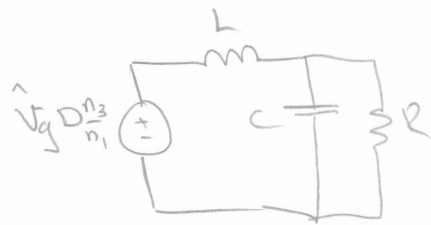
$$\langle i_g \rangle = \frac{1}{T} \int_0^T i_g dt = \frac{1}{T} \int_0^{D_1 T} i_L \frac{n_3}{n_1} + i_{Lm} dt + \frac{1}{T} \int_0^{D_2 T} -i_{Lm} dt$$

$$= i_L \frac{n_3}{n_1} D_1 + \cancel{D_1 i_{Lm}} - \cancel{D_2 i_{Lm}} \rightarrow 0$$

$$= \frac{n_3}{n_1} I_L D + \frac{n_3}{n_1} \hat{i}_L D + \frac{n_3}{n_1} I_L \hat{D}$$



$$C_{Vg} = \left. \frac{\hat{V}}{\hat{V}_g} \right|_{\hat{D}=0}$$



$$\hat{V} = \hat{V}_g D_{n_3}^{n_1} \frac{1}{sL + (sC + \frac{1}{R})^{-1}} \cdot (sC + \frac{1}{R})^{-1} \Rightarrow \frac{\hat{V}}{\hat{V}_g} = D_{n_3}^{n_1} \frac{1}{s^2 LC + \frac{sL}{R} + 1}$$

$$C_{Vd}(s) = \left. \frac{\hat{V}}{\hat{D}} \right|_{\hat{V}_g=0} \quad \hat{V}_g D_{n_3}^{n_1}$$

The diagram shows a simplified circuit for finding C_{Vd} . It consists of a voltage source $\hat{V}_g D_{n_3}^{n_1}$ in series with an inductor L , which is then connected to a parallel combination of a capacitor C and a resistor R .

$$\frac{\hat{V}}{\hat{D}} = \hat{V}_g \frac{n_3}{n_1} \frac{1}{s^2 LC + \frac{sL}{R} + 1}$$