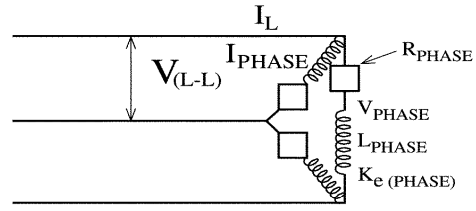
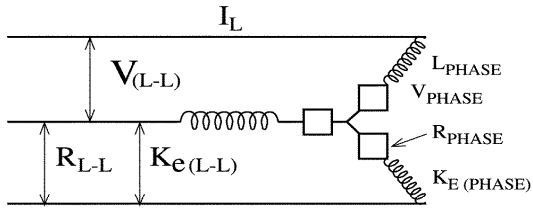


# TIME CONSTANTS FOR WYE/DELTA MOTOR CONNECTIONS

File: Motor Time Constants for wye/delta

George Younkin, P.E., MSEE



## WYE

$$\frac{V_{l-l}}{\sqrt{3}} = V_{\phi}$$

$$\frac{L_{l-l}}{2} = L_{\phi}$$

$$\frac{R_{l-l}}{2} = R_{\phi}$$

$$\frac{K_{e(l-l)}}{\sqrt{3}} = K_{e\phi}$$

$$K_T = K_T$$

$$J_L = J_{total}$$

$$I_L = I_{\phi}$$

## DELTA

$$V_{l-l} = V_{\phi}$$

$$L_{l-l} = \frac{2 L_{\phi}}{3}$$

$$R_{l-l} = \frac{2 R_{\phi}}{3}$$

$$\sqrt{3} K_{e(l-l)} = K_{e\phi}$$

$$K_T = K_T$$

$$J_L = J_{total}$$

$$\frac{I_L}{\sqrt{3}} = I_{\phi}$$

$$t_m = \frac{\frac{R_{l-l}}{2} K_T}{\frac{K_{e(l-l)}}{\sqrt{3}} J_L}$$

$$t_m = \frac{\frac{R_{l-l}}{2} 3 K_T}{K_{e(l-l)} \sqrt{3} J_L}$$

$$t_m = \frac{R_{l-l} K_T}{K_{e(l-l)} J_L} \times \frac{\sqrt{3}}{2}$$

$$t_m = \frac{R_{l-l} K_T}{K_{e(l-l)} J_L} \times 0.865$$

$$t_m = \frac{R_{l-l} K_T}{K_{e(l-l)} J_L} \times 0.865$$

$$t_e = \frac{L_{circuit}}{R_{circuit}} = \frac{L_{l-l}}{R_{l-l}}$$

$$t_e = \frac{\frac{3}{2} L_{l-l}}{\frac{3}{2} R_{l-l}} = \frac{L_{l-l}}{R_{l-l}}$$