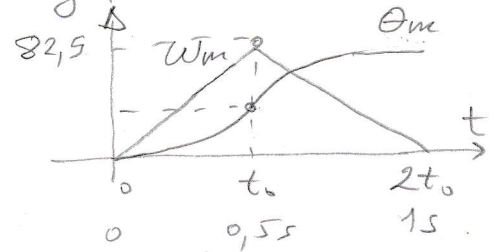


1.

$$J_{eq} = J_m + \left(\frac{\omega_L}{\omega_M}\right)^2 \cdot J_L = 2 + \left(\frac{1}{3}\right)^2 \cdot 20 = 4,22 \text{ kgm}^2$$

$$\frac{\omega_L}{\omega_M} = \frac{n_M}{n_L} = \frac{1}{3}$$



$$T_m = 700 \text{ Nm} = J_{eq} \cdot \frac{d\omega_m}{dt} \quad \int$$

$$\omega_m = \frac{T_m}{J_{eq}} t + \omega_m(0) \leftarrow 0$$

$$\omega_m(t_0) = \frac{T_{m1}}{J_{eq}} \cdot t_0 = \frac{700}{4,22} \cdot 0,5 = 82,9 \text{ rad/s}$$

$$\omega_m(2t_0) = \omega_m(t_0) + \frac{T_{m2}}{J_{eq}} (2t_0 - t_0)$$

$$= 82,9 + \frac{-700}{4,22} \cdot 0,5 = 0$$

$$\theta(t_0) = \int_0^{t_0} \omega_m(\tau) d\tau = \frac{\omega_m(t_0) \cdot t_0}{2} = \frac{82,9}{2} \cdot 0,5 = 20,725 \text{ rad}$$

$$\theta(2t_0) = 2 \cdot \theta(t_0) = 41,45 \text{ rad}$$

$$2. \quad T_m = k_T \cdot I_m = 1,3 \cdot 10 = 13 \text{ Nm};$$

$$T_{acc} = T_m - T_L = 13 - 3 = 10 \text{ Nm};$$

$$\frac{d\omega_m}{dt} = \frac{T_{acc}}{J_{eq}}; \quad J_{eq} = J_m + J_L = 0,5 + 1,5 = 2 \text{ kgm}^2;$$

$$\omega_m = \frac{T_{acc}}{J_{eq}} \cdot t = \frac{10}{2} \cdot 2 = 10 \text{ rad/s}$$

$$V_m = R_a \cdot I_a + k_E \cdot \omega_m = 0,68 \cdot 10 + 1,1 \cdot 10 = 17,8 \text{ V}.$$

3.

$$s_0 = 1500 - 1460 = 40 \text{ 1/min}$$

$$s_1 = 40/2 = 20; \quad n_1 = 1500 - 20 = 1480 \text{ 1/min};$$

$$P_0 = 25 \text{ kW}; \quad P_1 = \frac{P_0}{2} = 12,5 \text{ kW};$$

$$T_1 = \frac{P_1}{\omega_1} = \frac{12500}{155} = 80,6 \text{ Nm};$$

$$\omega_1 = \frac{2\pi}{60} \cdot n_1 = \frac{2\pi}{60} \cdot 1480 = 155 \text{ rad/s}.$$