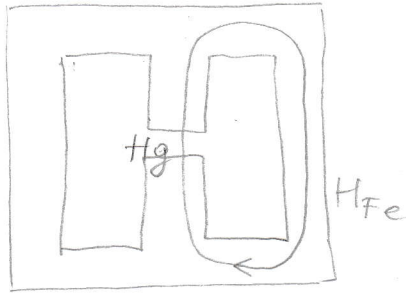


1



$$\oint H_{de} = NI$$

$$H_g \cdot l_g + H_{Fe} \cdot l_{Fe} = NI$$

$$H_g \cdot l_g = NI$$

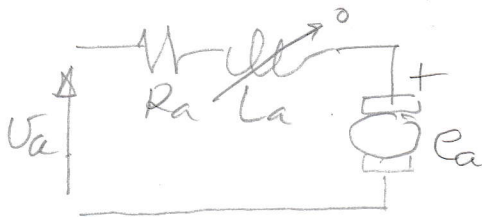
$$I_{max} = \frac{H_g \cdot l_g}{N}$$

$$H_g = \frac{B_{sat}}{\mu_0} = \frac{0,4}{4\pi \cdot 10^{-7}}$$

$$H_g = 318000 \text{ A/m} \Rightarrow$$

$$I_{max} = \frac{318000 \cdot 3,5 \cdot 10^{-3}}{90} = 12,37 \text{ A}$$

2



$$T_{em} = k_T I_{amax} = 1,3 \cdot 22 = 28,6 \text{ Nm}$$

$$T_{acc} = T_{em} - T_L = 28,6 - 3 = 25,6 \text{ Nm}$$

$$J_{eq} \cdot \frac{dw_m}{dt} = T_{acc}$$

$$J_{eq} = 0,063 + 0,1 = 0,163 \text{ kgm}^2; w_m(t) = \frac{T_{acc}}{J_{eq}} \cdot t; w_m(0) = 0$$

$$w_{mmax} = 2500 \cdot \frac{2\pi}{60} = 262 \text{ rad/s}$$

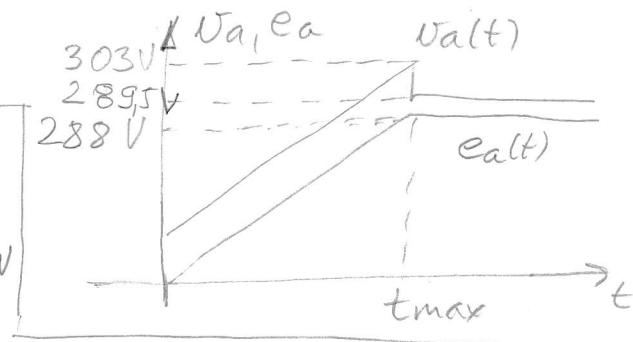
$$t_{max} = w_{mmax} \cdot \frac{J_{eq}}{T_{acc}} = 262 \cdot \frac{0,163}{25,6} = 1,67 \text{ s}$$

$$0 \leq t < t_{max}: w_m(t) = \frac{T_{acc}}{J_{eq}} \cdot t = 157 t$$

$$e_a = k_e w_m(t) = 1,1 \cdot 157 t = 172,8 t$$

$$U_a(t) = R_a I_{amax} + e_a(t) = 14,96 + 172,8 t$$

$$I_a = \frac{3}{1,3} = 2,3 \text{ A}$$



$$P_{el} = \sqrt{3} UI \cos \phi$$

$$= \sqrt{3} \cdot 400 \cdot 48 \cdot 0,85 = 28,27 \text{ kW}$$

$$\eta = \frac{P_{mech}}{P_{el}} = \frac{25}{28,27} = 88,4\%$$

$$P_{diss} = P_{el} - P_{mech} = 3,27 \text{ kW}$$

$$P_{mech} = w_m T_{el} \Rightarrow T_{el} = \frac{P_{mech}}{w_m}; w_m = 1460 \cdot \frac{2\pi}{60} = 152,9 \frac{\text{rad}}{\text{s}}$$

$$T_{el} = \frac{25000}{152,9} = 163 \text{ Nm}$$