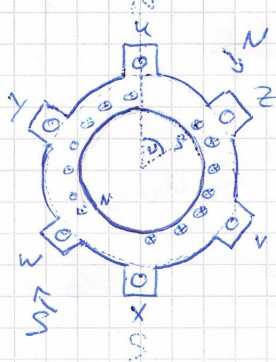


(ü)

K&A

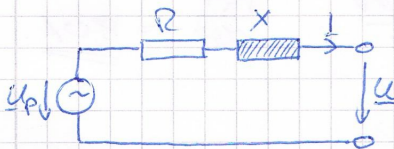
02.11.09

Synchronmaschine: $u/v/w \hat{=}$ Hinderter $x/y/z \hat{=}$ Rücklerter

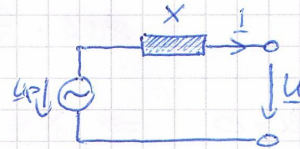
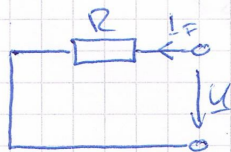
$$u, x = \pm \hat{u} \cdot \sin(\omega \cdot t)$$

$$v, y = \pm \hat{u} \cdot \sin(\omega \cdot t + \frac{2}{3}\pi)$$

$$w, z = \pm \hat{u} \cdot \sin(\omega \cdot t + \frac{4}{3}\pi)$$

Stator-ESB:

$$R \ll X$$

Rotor-ESB:

mit $U_p \sim n \cdot I_f$,
 $X \sim n$

Leerlauf:

$$I = 0, I_f = I_{f0}, n = n_1$$

$$\Rightarrow U_p = U = U_{N, str} \text{ (Nenn-Strang-Spannung)}$$

Kurzschluss:

$$U = 0, I_f = I_{f0}, n = n_1$$

$$\Rightarrow X = \frac{U_p}{I_{k0}} \Rightarrow I_{k0} = \frac{X}{U_p} = \frac{U_{N, str}}{X}$$

Für Zeigerschramme gilt daher:

$$U_p = U + jX \cdot I$$

$$1. \quad I_N = \frac{S_N}{\sqrt{3} U_N} = \frac{320 \text{ MVA}}{\sqrt{3} \cdot 21 \text{ kV}} = \underline{\underline{8.798 \text{ A}}}$$

$$n_1 = \frac{f_{\text{wr}}}{n} = \frac{50 \text{ Hz}}{1} = \underline{\underline{50 \text{ Hz}}}$$

$$\text{LL: } I=0 \Rightarrow \underline{U_P = U}$$

$$U_P \sim n \cdot I_F, \quad n_1 \cdot I_{F0} \sim U_{N, \text{str}}$$

$$\Rightarrow \frac{U_P}{U_{N, \text{str}}} = \frac{n}{n_1} \cdot \frac{I_F}{I_{F0}}, \quad U_P = U$$

$$I_{F0} = I_F \cdot \frac{n}{n_1} \cdot \frac{U_{N, \text{str}}}{U}$$

$$= 80 \text{ A} \cdot \frac{1000}{3000} \cdot \frac{21 \text{ kV}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{7 \text{ kV}} = \underline{\underline{80 \text{ A}}}$$

$$\text{KS: } U=0 \Rightarrow X = \frac{U_P}{I}$$

$$U_P = U_{N, \text{str}} \cdot \frac{n}{n_1} \cdot \frac{I_F}{I_{F0}} = \underline{\underline{6.062 \text{ V}}}$$

$$\Rightarrow X = \frac{6.062 \text{ V}}{2280 \text{ A}} = \underline{\underline{2.6595}}$$

$$k_c = \frac{U_{N, \text{str}}}{X \cdot I_N} = \underline{\underline{0.518}}$$

Zeigerdiagramm:

4 kV/cm

$$\Rightarrow U_{N, \text{str}} \hat{=} 3.031 \text{ cm}$$

$$X \cdot I_N \hat{=} 5.8485 \text{ cm}$$

$$\varphi_N = 35^\circ$$

$$\varphi_N = 36.87^\circ$$

$$I_F = I_{F0} = \frac{U_P \cdot \sqrt{3}}{U_N} = 212 \text{ A}$$

