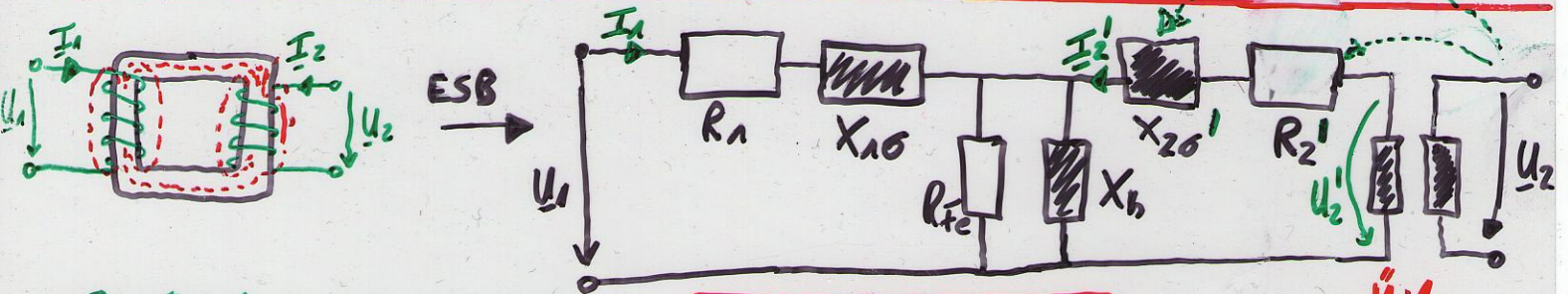


4. KGÜ (Trafo + 3-Phasen-System)



• Primärseitige Bezugsgrößen:

$$\begin{aligned} U_2' &= \hat{u} \cdot U_2 \\ I_2' &= \frac{1}{\hat{u}} \cdot I_2 \\ Z' &= \hat{u}^2 \cdot Z \end{aligned}$$

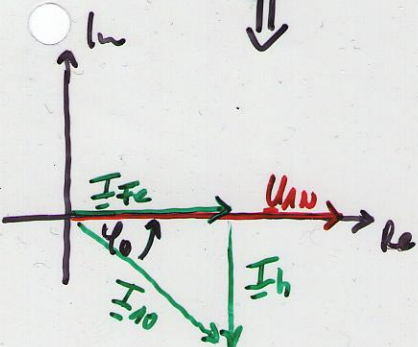
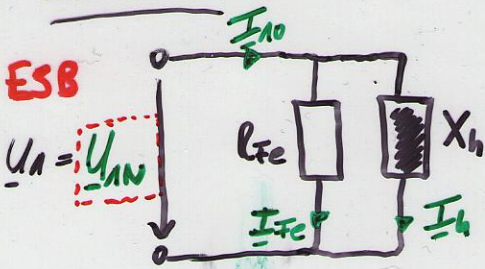
$$\frac{I_1}{I_2} = \frac{1}{\hat{u}}, \quad \frac{U_1}{U_2} = \hat{u}$$

$\hat{u} = 1$
(= w_1/w_2)
(idealer Übertrager)

• Messungen am Transformator (Parameter bestimmen)

Annahmen $\parallel$ $R_1 = R_2' \ll R_{Fe}$
 $X_{1\sigma} = X_{2\sigma}' \ll X_h$

LEERLAUFMESSUNG (Index 0)



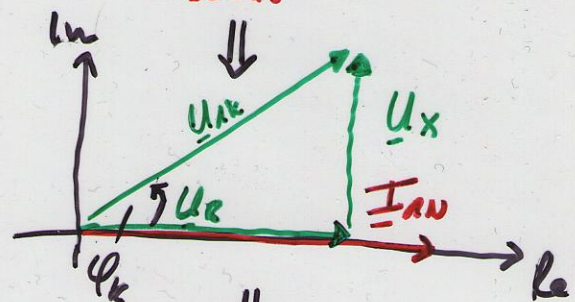
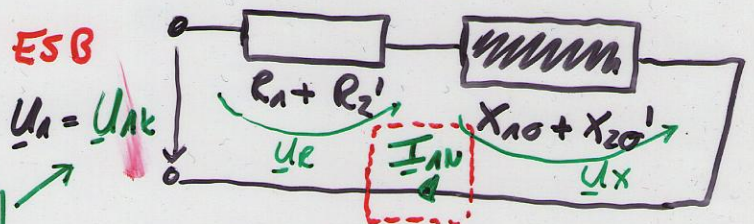
$$\frac{U_{1N}}{U_{1N}} = \frac{U_{1N}}{U_{1N}}$$

$$\begin{aligned} P_0 &= S_0 \cdot \cos \varphi_0 = U_{1N} \cdot I_{10} \cdot \cos \varphi_0 \\ &= \frac{U_{1N}^2}{R_{Fe}} \quad / \quad Q_0 = \dots \end{aligned}$$

$$X_h = \frac{U_{1N}}{I_{10} \sin \varphi_0}$$

$$R_{Fe} = \frac{U_{1N}}{I_{10} \cos \varphi_0}$$

KURZSCHLUSSMESSUNG (k)



$$\begin{aligned} P_k &= U_{1N} \cdot I_{1N} \cdot \cos \varphi_k = \\ &= (R_1 + R_2') I_{1N}^2 \\ Q_k &= \dots \end{aligned}$$

$$Z R_1 = Z R_2' = \frac{U_{1N} \cdot \cos \varphi_k}{I_{1N}}$$

$$Z X_{1\sigma} = Z X_{2\sigma}' = \frac{U_{1N} \cdot \sin \varphi_k}{I_{1N}}$$

• Nennbetrieb: $S_N = U_N \cdot I_N$
(Überlastung: $U_1 > U_{1N}$ und/oder $I_1 > I_{1N}$)