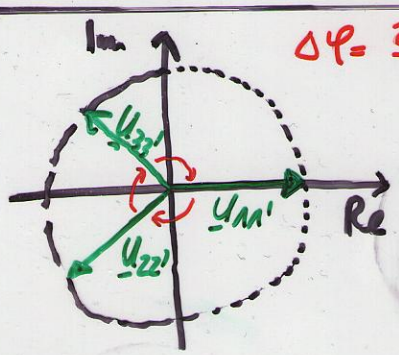
Symmetrisches 3-Phasen-System:

KG-Aufgabe: KG 17 (Drehbank)

Hausaufgabe: • KG 18 (3-Phasen-Trafo)
• Kapitel 6.9.1 (unsymm. Belastung)

Hinweis: $\arg(\underline{I}_{1'2'}) = 0°$
$\arg(\underline{I}_{2'3'}) = -120°$
$\arg(\underline{I}_{3'1'}) = 120°$

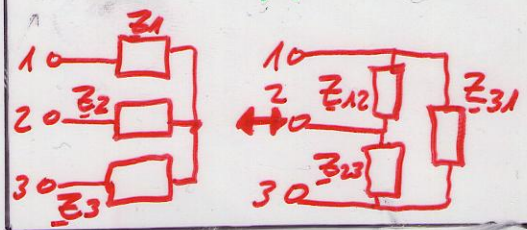


$\Delta\varphi = \frac{2\pi}{3} \hat{=} 120°$

$\underline{U}_{11'} + \underline{U}_{22'} + \underline{U}_{33'} = 0$

Bei Symmetrie → Y-Y → 1-phasiges ESB

dazu: Y-Δ- und Δ-Y-Trafo

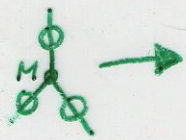


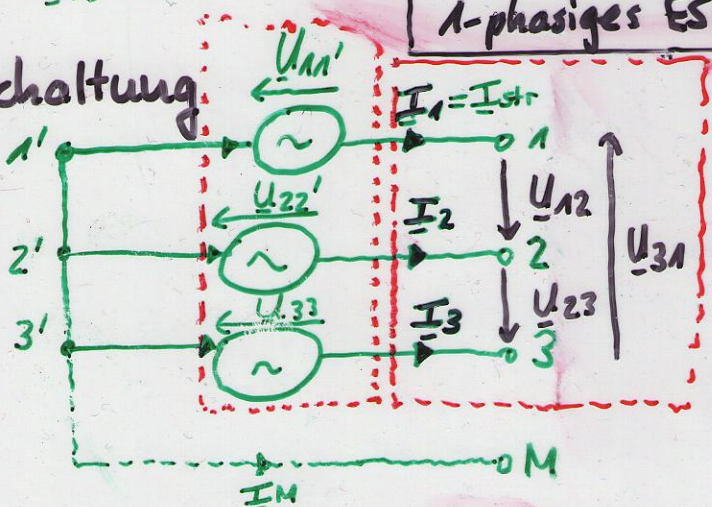
$$\underline{Z}_Y = \frac{1}{3}\underline{Z}_\Delta$$

(wenn $\underline{Z}_1 = \underline{Z}_2 = \underline{Z}_3$ symm.)

1-phasiges ESB: siehe Bsp. 6.8.1.4

1.) Sternschaltung

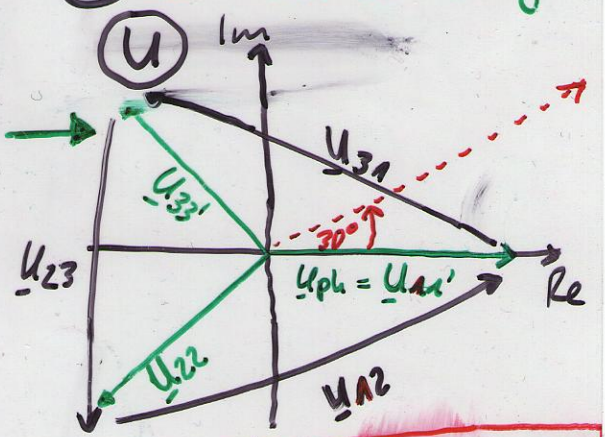




Strang (Außen-)Leiter

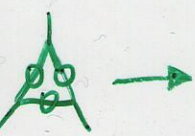
(I) Leiterstrom = Strangstr.

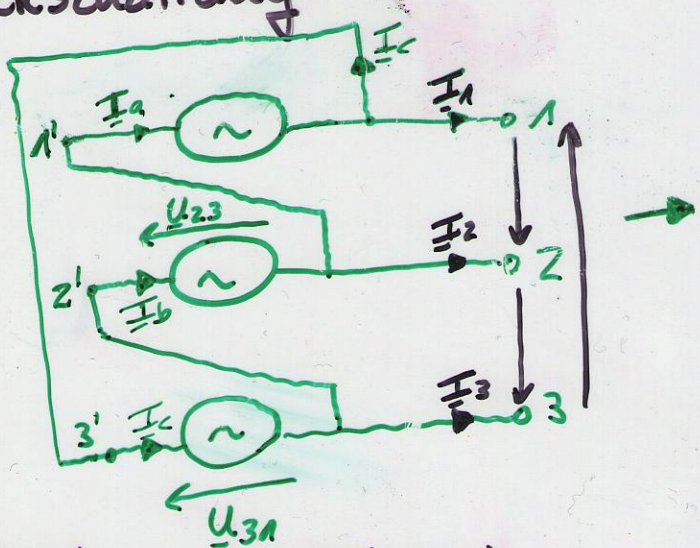
(U)



Es gilt: $\underline{U} = \sqrt{3}\,\underline{U}_{ph}\, e^{j30°}$

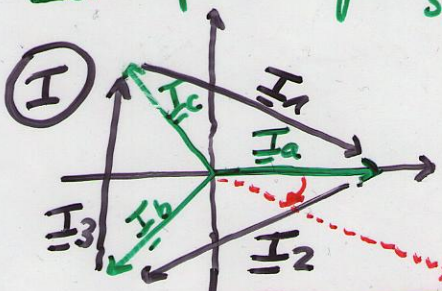
2.) Dreieckschaltung





(U) Leiterspannung = Strangsp.

(I)



Es gilt: $\underline{I} = \sqrt{3}\,\underline{I}_{str}\, e^{-j30°}$

Gesamtleistung (3 x Phase)

$\underline{S} = 3 \cdot \underline{U}_{str} \cdot \underline{I}_{str}^* = 3 \cdot U_{str} I_{str}\, e^{j\varphi}$ (über Strang)

$\underline{S} = \sqrt{3} \cdot U \cdot I\, e^{j\varphi}$ (über Außenleiter)