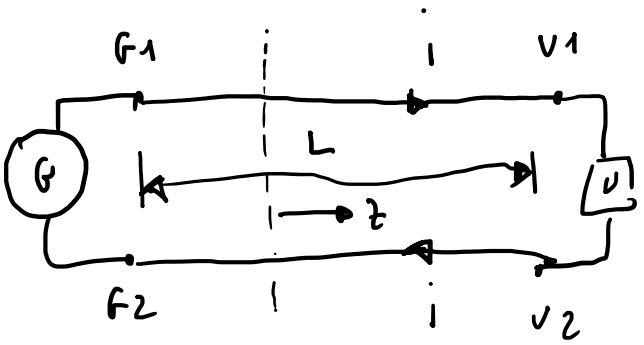
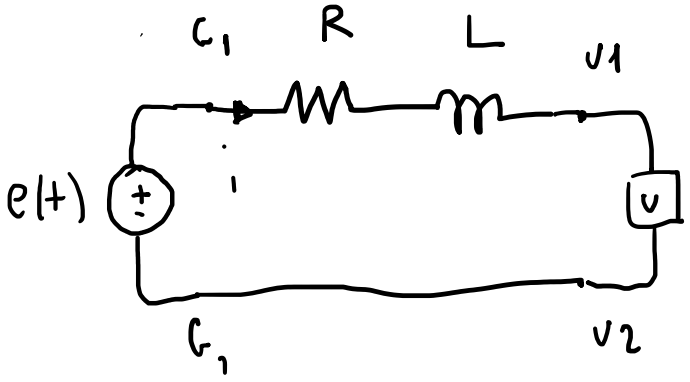


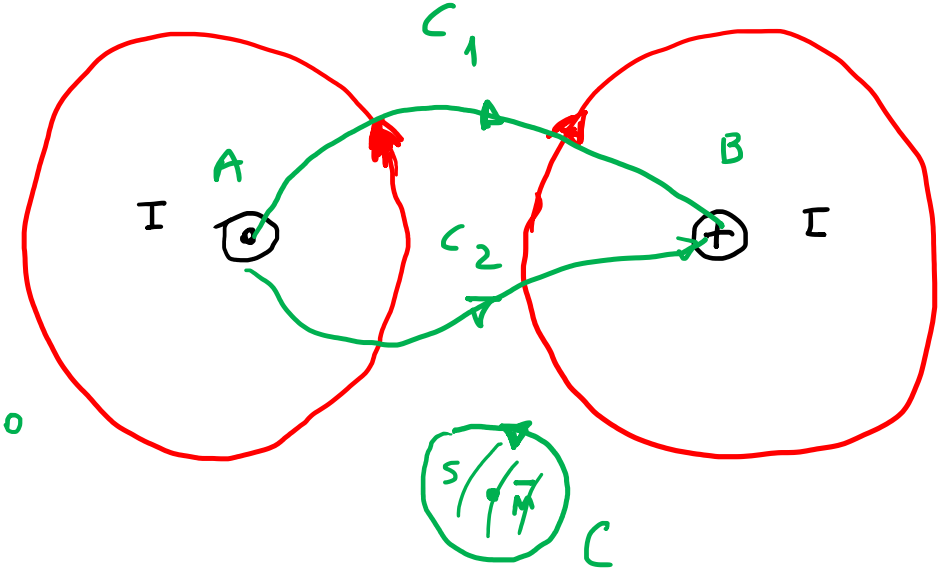
$$R_{CAVO} = \rho \frac{L}{S_{CAVO}}$$

$$R = 2\, R_{CAVO}$$



LINEA CORTA

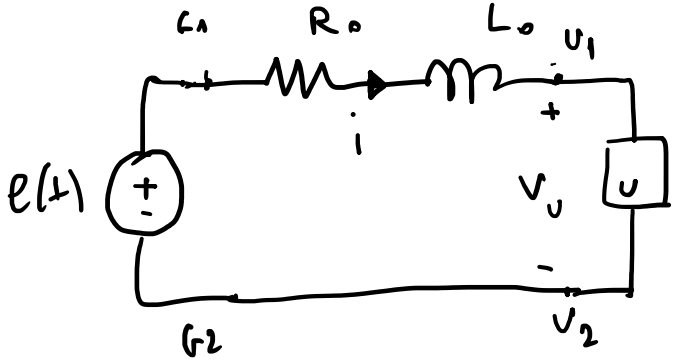
$$\nabla \times \bar{E} = -\frac{\partial \bar{B}}{\partial t} \neq 0$$



$$\int_{A,C_1}^{B} \bar{E}\cdot d\bar{\ell} = \int_{A,C_2}^{B} \bar{E}\cdot d\bar{\ell} = V_{AB}$$

$$\oint_C \bar{E}\cdot d\bar{\ell} = -\frac{d}{dt}\int_S \bar{B}\cdot \bar{n}\, ds = 0$$

$$z = z_0$$



$f = 50\ Hz$, $V_{V,e} = 210\ V$

$P_V = 8\ kW$, $\cos\varphi_V = 0.6$, $\varphi_V > 0$

$R_0 = 0.2\ \Omega$, $\omega L_0 = 0.3\ \Omega$

$$-\underline{E} + (R_0 + j\omega L_0)\underline{I} + \underline{V}_V = 0$$

$\underline{I} = I_e$ RIFERIMENTO ANGOLI DI FASE

$\alpha_i = 0$

$\varphi_V = \alpha_{V_V} - \alpha_i$

$\alpha_{V_V} = \varphi_V$

$$\underline{V}_V = V_{Ve}\, e^{j\varphi_V} = 210\left[\cos\varphi_V + j\sin\varphi_V\right]$$

$\varphi_V = \cos^{-1}(0.6) = 0.9273$ rad

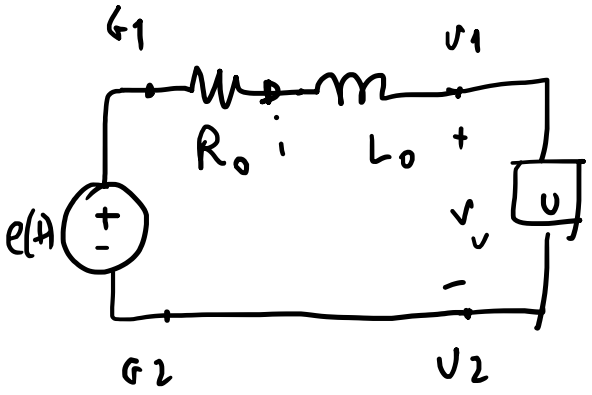
$\underline{V}_V = 126 + j\,168$

$$P_V = V_{V,e}\, I_e \cos\varphi_V \Rightarrow I_e = \frac{P_V}{V_{V,e}\cos\varphi_V} =$$

$$I_e = \frac{8\times10^3}{210\times 0.6} = 63.49\ A \qquad \underline{I} = 63.49$$

$$\underline{E} = \underline{V}_V + (R_0 + j\omega L_0)\underline{I} = 126 + j168 + (0.2 + j\,0.3)\times 63.49 = 138.7 + j\,187$$

$$E_e = \sqrt{138.7^2 + 187^2} = 232.8\ V$$



$$I_e = \frac{P_v}{V_{v,e} \cos \varphi_v} = 63.43 \text{ A}$$

$$P_0 = R_0 I_e^2 = 0.2 \times 63.43^2 = 806.2 \text{ W}$$

$$Q_0 = \omega L_0 I_e^2 = 0.3 \times 63.43^2 = 1209 \text{ VAR}$$

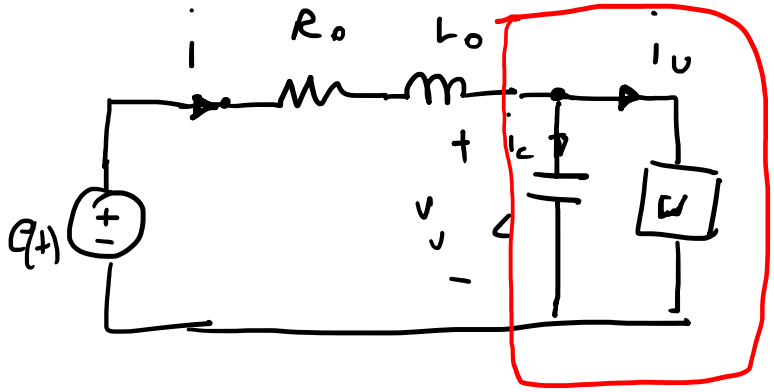
$$P_v = 8000 \text{ W}$$

$$Q_v = P_v \tan \varphi_v = 8000 \times \tan(0.8273) = 8000 \times 1.333 = 10\,667 \text{ VAR}$$

$$P_E = P_0 + P_v = 806.2 + 8000 = 8806.2 \text{ W}$$

$$Q_E = Q_0 + Q_v = 1209 + 10\,667 = 11\,876 \text{ VAR}$$

$$A_E = E_e I_e = \sqrt{P_E^2 + Q_E^2} \Rightarrow E_e = \frac{\sqrt{8806^2 + 11876^2}}{63.43} = 232.3 \text{ V}$$



$V_{U,e} = 210\ V$, $P_U = 8000\ W$

$\cos\varphi_U = 0.6$, $\varphi_U > 0$

$\cos\varphi = 0.9$ $\quad \varphi > 0$ $\quad f = 50\ Hz$

$\varphi = \cos^{-1}(0.9) = 0.451\ rad$

$$C = \frac{P_U \cdot (\tan\varphi_U - \tan\varphi)}{\omega\, V_{U,e}^2} = \frac{8000\ (\tan(0.9273) - \tan(0.451))}{2\times\pi\times 50\times 210^2} =$$

$$= 4.3\times 10^{-4}\ F$$

$$I_e = \frac{P_U}{V_{U,e}\cos\varphi} = \frac{8000}{210\times 0.9} = 42.33\ A$$

$$P_0 = R_0 I_e^2 = 0.2\times 42.33^2 = 358.4\ W$$

$$Q_0 = \omega L_0 I_e^2 = 0.3\times 42.33^2 = 537.5\ VAR$$

$$Q_U' = P_U' \cdot \tan\varphi = 8000\times\tan(0.451) = 3874\ VAR$$

$$P_E = P_0 + P_U = 8000 + 358.4 = 8358\ W$$

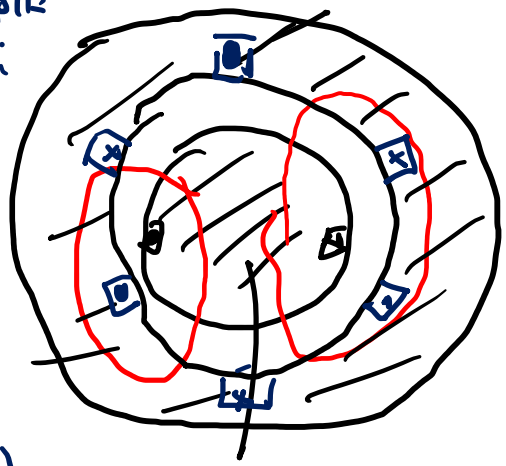
$$Q_E = Q_0 + (Q_U + Q_C) = Q_0 + Q_U' = 537.5 + 3874 = 4411\ VAR$$

$$E_e = \frac{\sqrt{P_E^2 + Q_E^2}}{I_e} = 223.3\ V$$

$$I_e = \frac{P}{V_e \cos\varphi} \qquad P_0 = R_0 I_e^2 \qquad R_0 = \rho \frac{L}{S_{CAVO}}$$

GENERATORE SINCRONO TRIFASE

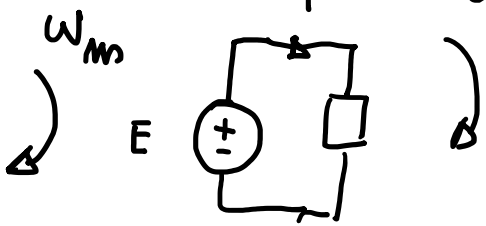
STATORE



p = NUMERO DI COPPIE DI POLI

$\omega = p\,\omega_m$

ROTORE



CAMPO ROTANTE

$\omega_c = \omega_m$

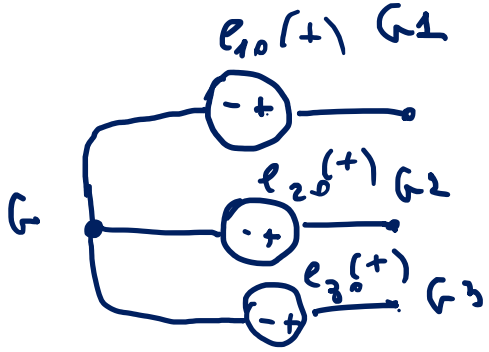
i = COSTANTE NEL TEMPO (C.C.)

$$e_{10}(t) = E_{0M} \cos(\omega t + \alpha_1)$$

$$e_{20}(t) = E_{0M} \cos(\omega t + \alpha_2)$$

$$e_{30}(t) = E_{0M} \cos(\omega t + \alpha_3)$$

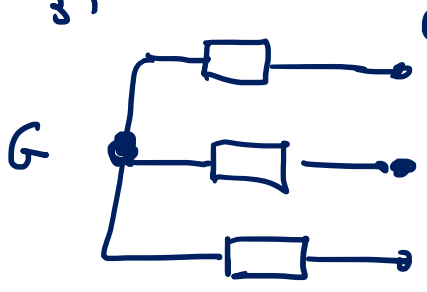
ROTORE



$$\alpha_2 = \alpha_1 - \frac{2}{3}\pi$$

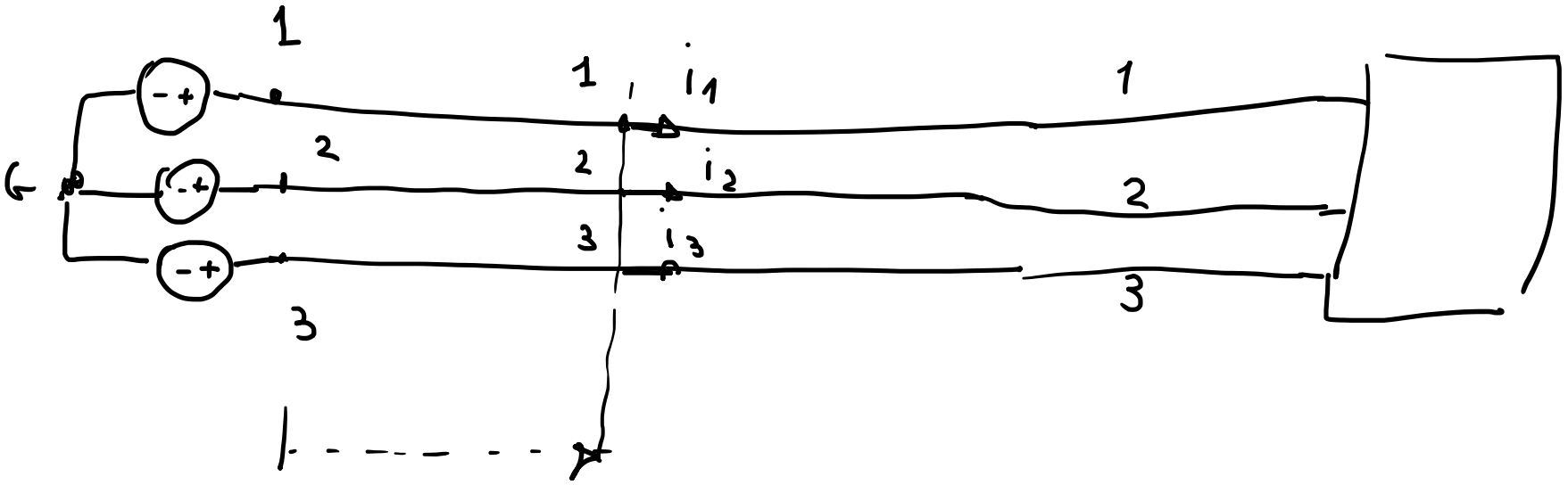
$$\alpha_3 = \alpha_2 - \frac{2}{3}\pi$$

$$\alpha_1 = \alpha_3 - \frac{2}{3}\pi$$



COLLEGAMENTO A STELLA

SISTEMA TRIFASE



TENSIONI CONCATENATE V_{12}, V_{23}, V_{31}

CORRENTI DI LINEA $\dot{I}_1$, $\dot{I}_2$, $\dot{I}_3$

SISTEMA SIMMETRICO $V_{12,c} = V_{23,c} = V_{31,c}$

SISTEMA EQUILIBRATO $\dot{I}_{1c} = \dot{I}_{2c} = \dot{I}_{3c}$