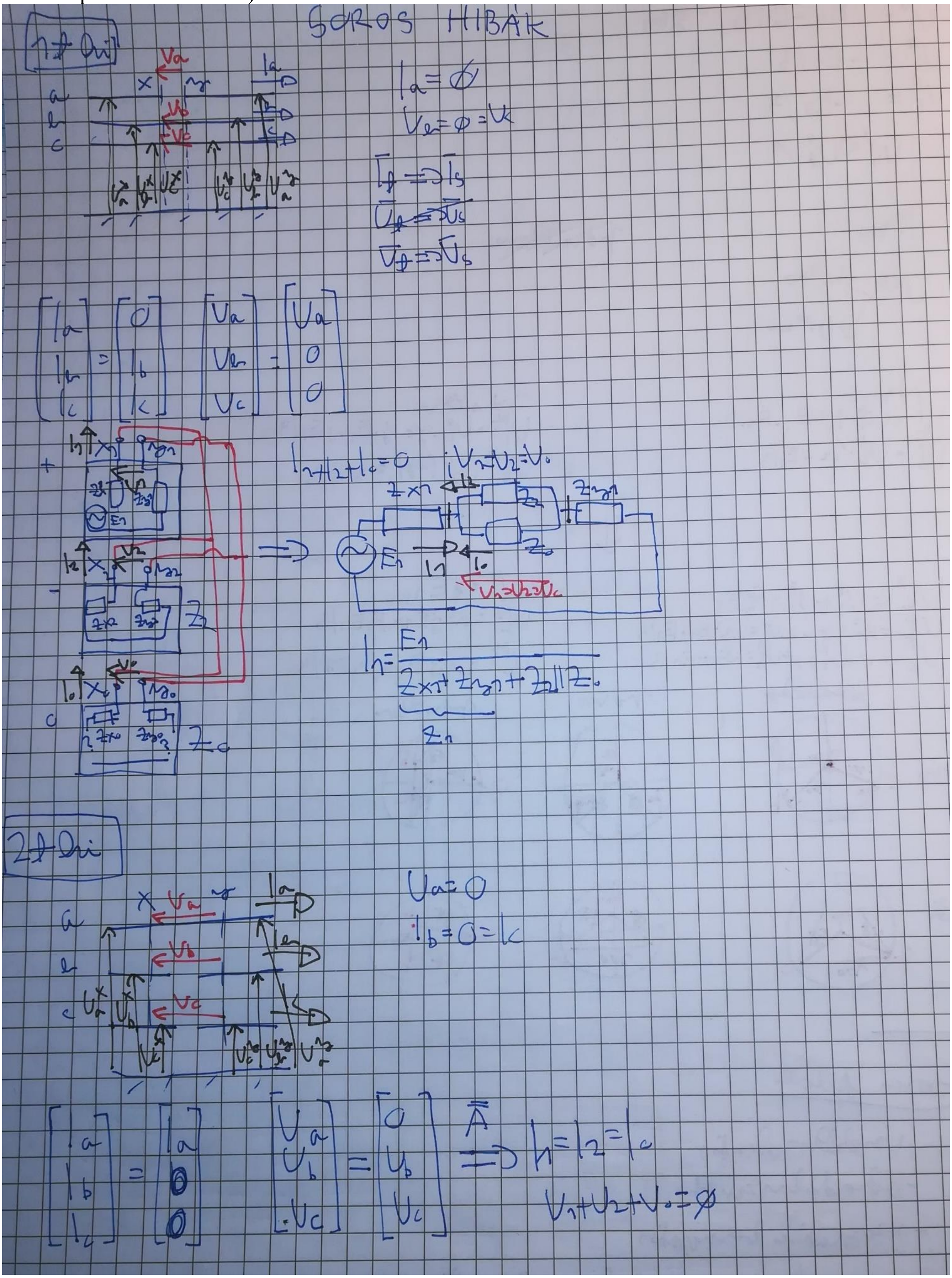
Hartmann Bálint
előadásai, gyakorlatai

Átvitel soros hibák
2019.11.18. EA

Soros hibák kiváltó okai: vezetékszakadás, olvadóbiztosító kiolvadása, megszakító beragadása (VA- visszakapcsoló automatika)



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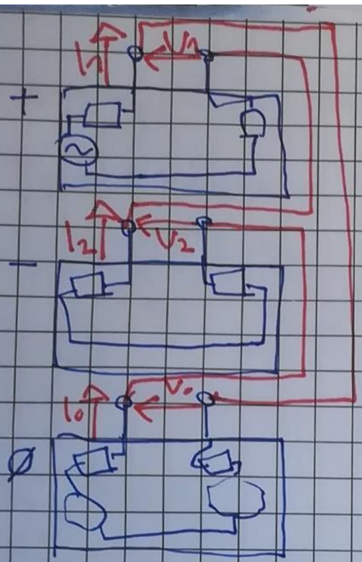
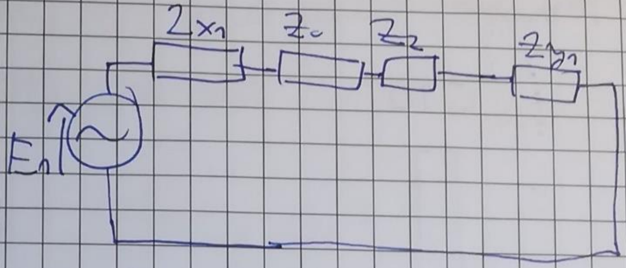
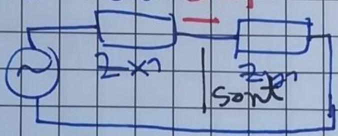




$$I_1 = \frac{E_1}{Z_{x1}+Z_{y1}+Z_2+Z_0}$$

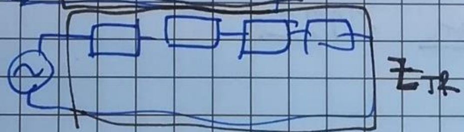
Transzfer impedancia Soros

Soros



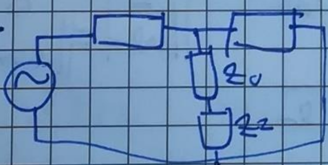
1 fázi

2 fázi

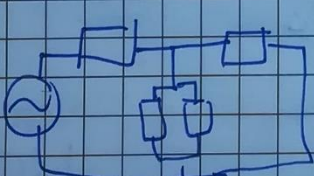


Sönt

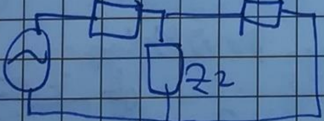
1FN Z



2FN



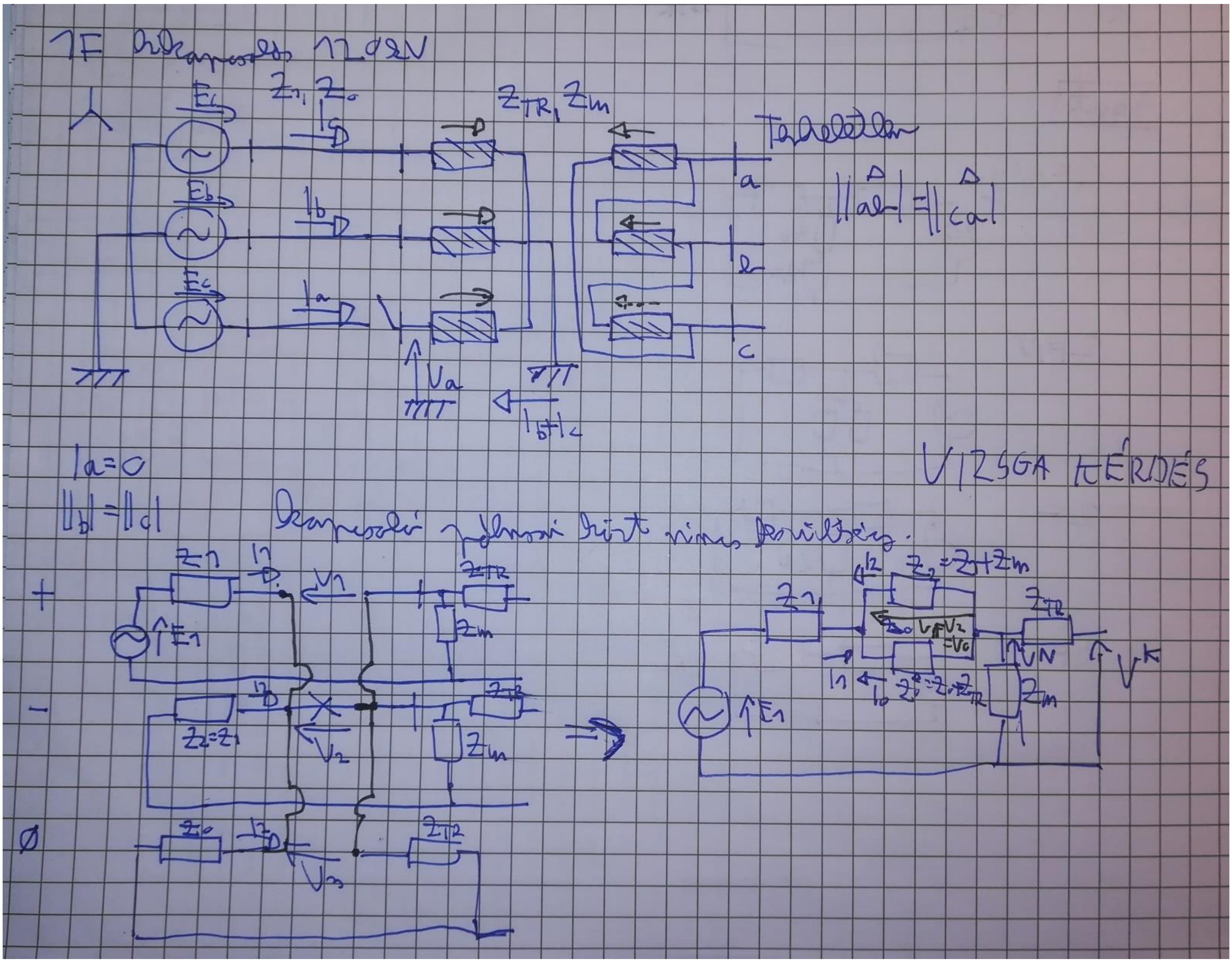
2F



3F

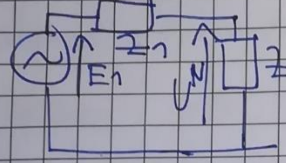
∞

Átvitel soros hibák
2019.11.22. 7. GYAK



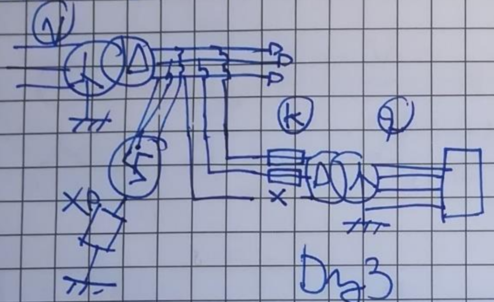
$|Z_1+Z_m| >> |Z_0+Z_{TR2}| \Rightarrow I_2 \approx 0 \Rightarrow I_1=-I_0$

$I_1 \approx$ | mágnesezési $\rightarrow U_0 = I_0 Z_0^e \approx 0$

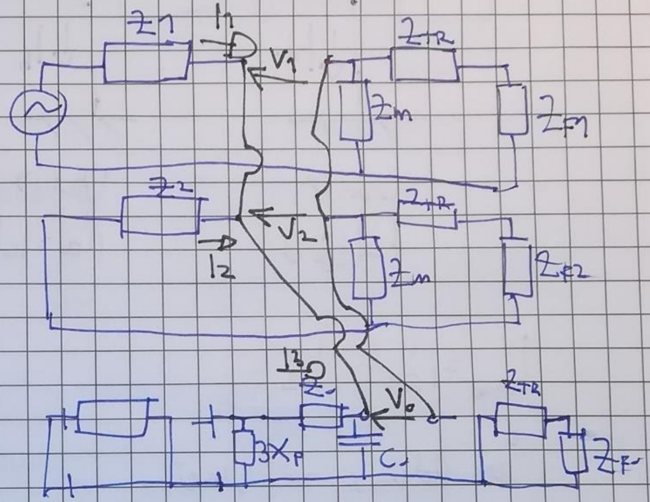


$|U^N| \approx |E_1| \approx |U^k|$

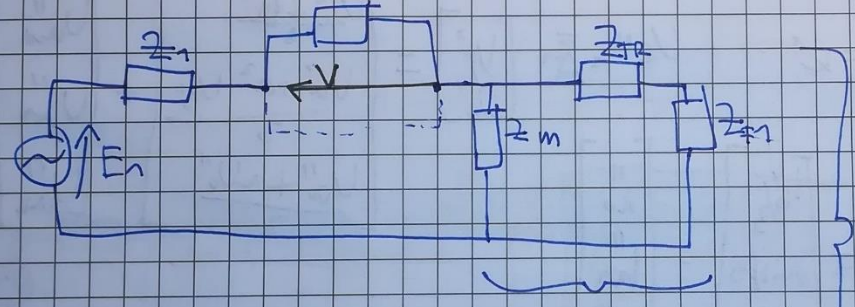
1F zn. KÖF



Dy3



$Z_2^e = Z_2 + Z_m \| (Z_{TR} + Z_{F2})$



$V = U_1^k = E_1/2$

$Z_1 = Z_2,\ Z_{F1} = Z_{F2}$ $\qquad Z_m \times (Z_{TR} + Z_{F1})$

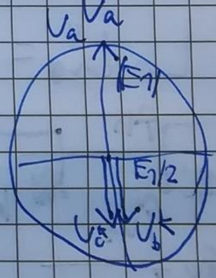
$|V| = \frac{|E_1|}{2} \Rightarrow |V| \approx |U_1^k|$

$U_1^k = U_1^k \cdot e^{-j90°} = E_1/2\ e^{-j90°} = -jE/2$

$U_2^e = U_2^k \cdot e^{+j90°} = -E_1/2\ e^{+j90°} = -jE_1/2$

$\bar{U}_S \Rightarrow \bar{U}_f \qquad U_a^k = U_1^k + U_2^k = -jE_1$

$U_b^k = U_c^k = \underbrace{(a+a^2)}_{-1}(-jE_1/2) = jE_1/2$ [illegible]



Szimultán hibák

| egyidejű |

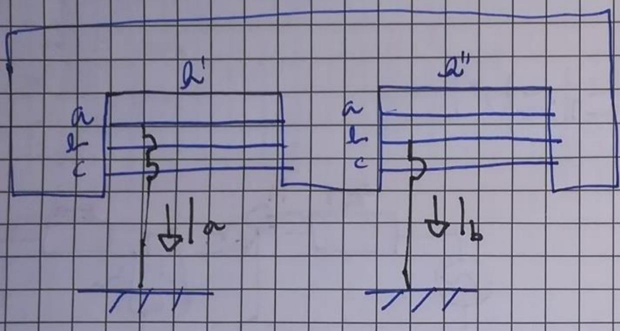
- vezetékszakadás + föld/fázis érintés
- [illegible] hibák . kettős földzárlat

1F zárlat. [illegible]

$U\uparrow \rightarrow$ [illegible]

- azonos, vagy eltérő fázis

V.



$U_a = 0$ $\qquad\qquad$ $U_b = 0$

$I_b = I_c = 0$ $\qquad\qquad$ $I_a = I_c = 0$

$I'_{a0} = I'_{a1} = I'_{a2}$

↓

a fázisa referencia

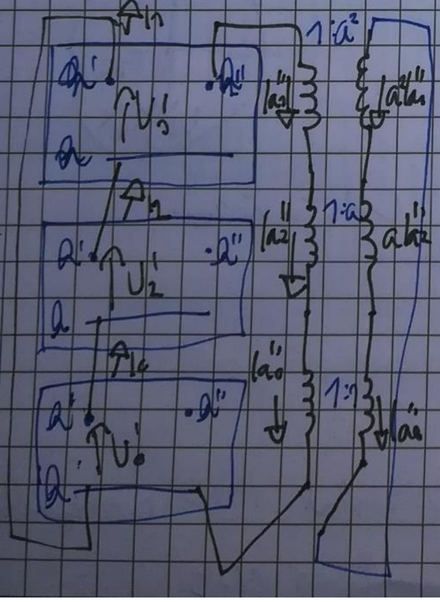
$U'_{a0} + U'_{a1} + U'_{a2} = 0$

$$U''_S = \bar{\bar{A}}^{-1} \begin{bmatrix} U''_a \\ 0 \\ U''_c \end{bmatrix} = \begin{bmatrix} \frac{U''_a + U''_c}{3} \\ \frac{U''_a + a^2 U''_c}{3} \\ \frac{U''_a + a U''_c}{3} \end{bmatrix} = \begin{bmatrix} U''_{a0} \\ U''_{a1} \\ U''_{a2} \end{bmatrix}$$

$$\bar{I}''_S = \bar{\bar{A}}^{-1} \begin{bmatrix} 0 \\ I''_b \\ 0 \end{bmatrix} = \begin{bmatrix} I''_b/3 \\ a I''_b/3 \\ a^2 I''_b/3 \end{bmatrix} = \begin{bmatrix} I''_{a0} \\ I''_{a1} \\ I''_{a2} \end{bmatrix}$$

$\hookrightarrow U''_{a0} = U''_{a0} + a^2 U''_{a1} + a U''_{a2} = 0$

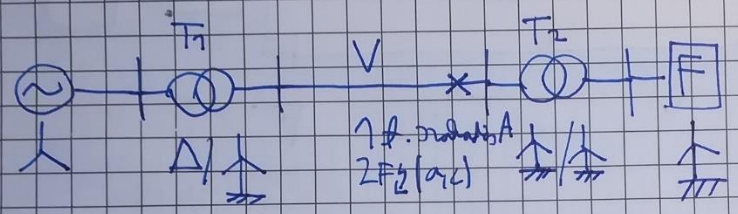
$\hookrightarrow I''_{a0} = a^2 I''_{a1} = a I''_{a2}$

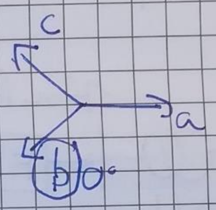


0. A hálózat kialakításának mely pontjából milyen speciális feltétel teljesülése esetén lesz végtelen a tranzit impedancia 2F fázisváltásnál?

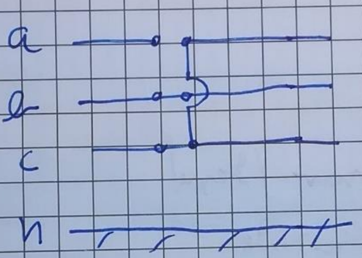
- ~~földelt~~ delta NF oldali transzformátor
- nem földelt csillagpont

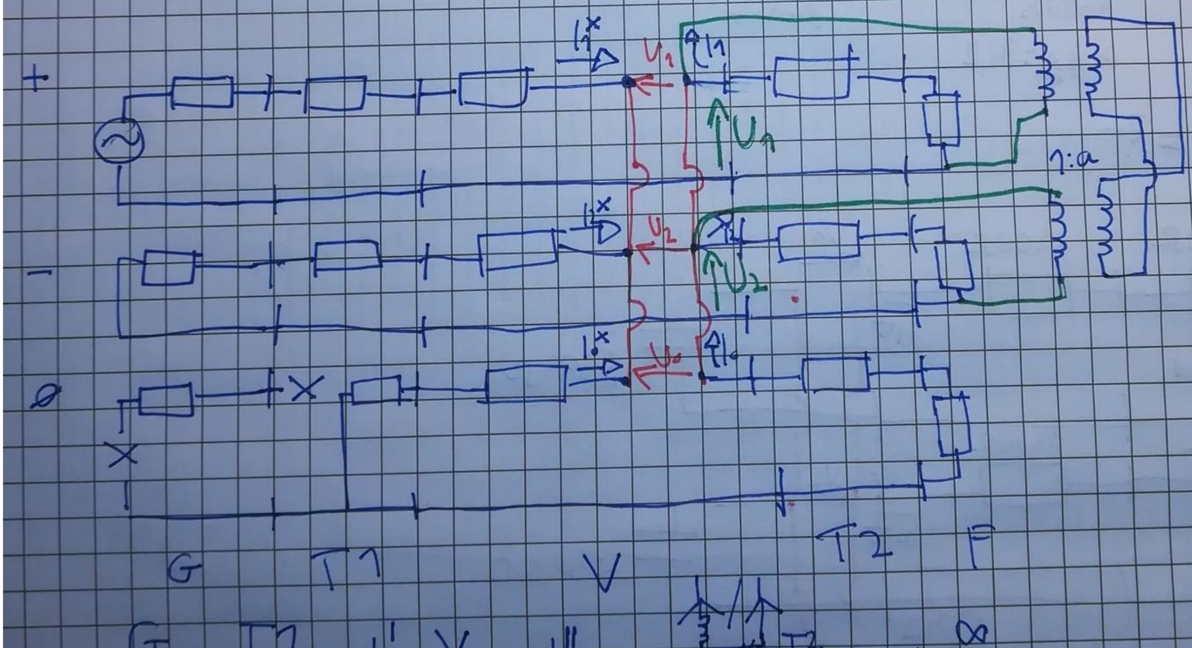
1.



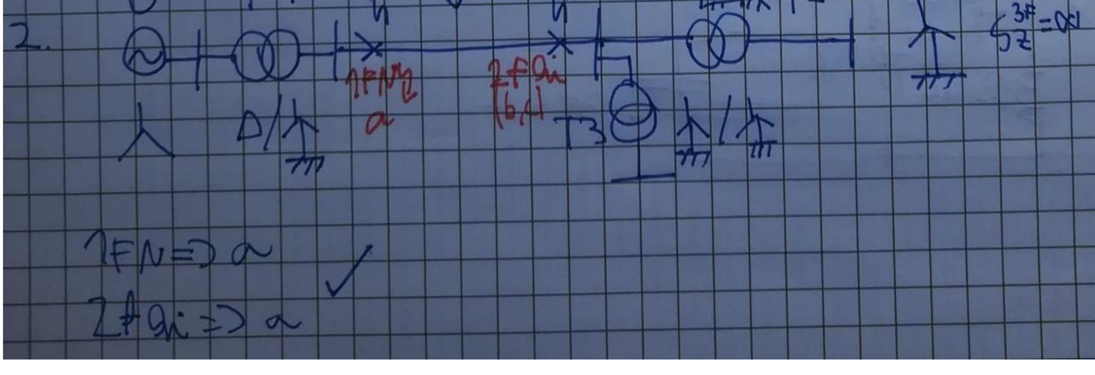


(b,c) ⇒ (a,c)



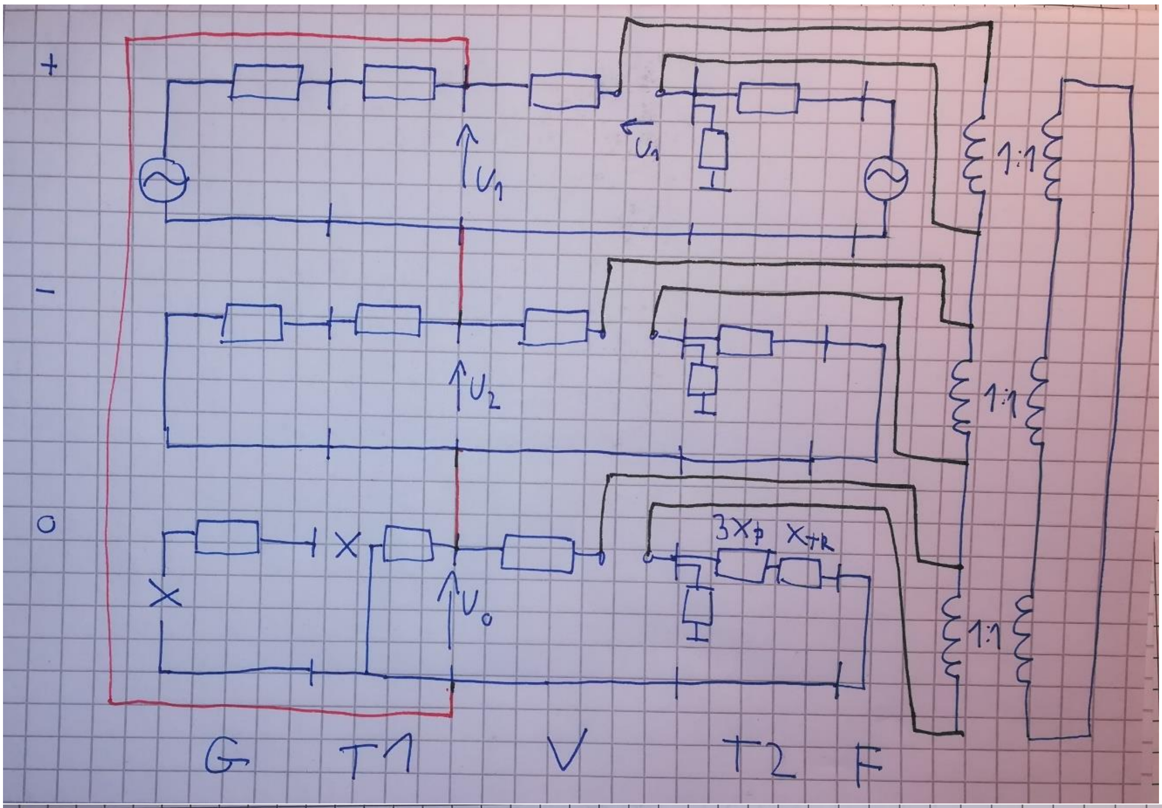


2.



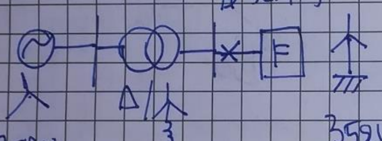
1FN ⇒ a ✓

2F fázi ⇒ a



3.

1f zr. (a)

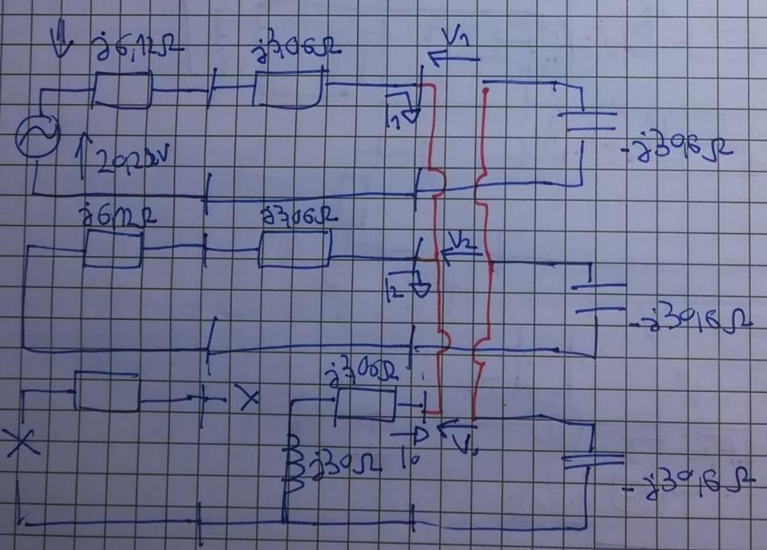


10 kV
40 MVA
$X_1 = X_2 = 20\%$

10/35 kV
40 MVA
$\varepsilon = 10\%$
$X_{f} = 10\,\Omega$

35 kV
40 Mvar / fázis

$U_a, U_b, U_c = ?$



35kV na redukciju

$$U_G = 10/\sqrt{3} \cdot \frac{35}{10} = 20{,}2\,kV$$

$$X_1^G = X_2^G = 0{,}2 \cdot \frac{10\,kV^2}{40\,MVA} \cdot \left(\frac{35}{10}\right)^2 = 6{,}12\,\Omega$$

$$X_1^T = X_2^T = X_0^T = 3{,}06\,\Omega$$

$$Z^F = \frac{(35\,kV)^2}{40\,Mvar} = 30{,}6\,\Omega$$

$$3X_{\cancel{faze}} = 30\,\Omega$$

$$Z_1^e = (j6{,}12 + j3{,}06 - j30{,}6)\,\Omega = -j21{,}42\,\Omega$$

$$Z_2^e = Z_1^e = -j21{,}42\,\Omega$$

$$Z_0^e = (j3{,}06 + j30 - j30{,}6)\,\Omega = j2{,}46\,\Omega$$

$$I_1 = \frac{U_G}{Z_1 + Z_2 \| Z_0} = \frac{20{,}2\,kV}{(j2{,}78 - j21{,}44)\,\Omega} = +j1{,}0852\,A$$

$$U^G - I_1 Z_1^e - U_1 = \emptyset \Rightarrow U_1 = U_G - I_1 Z_1^e = 20{,}2\,kV - j1{,}0852\,A(-j21{,}42)\,\Omega = -3\,kV =$$

$$= V_2 = V_0$$

$$\overline{V}_s \Rightarrow \overline{V}_f \quad \boxed{V_a = -9\,kV} \quad V_b = 0 \quad V_c = 0$$

t.