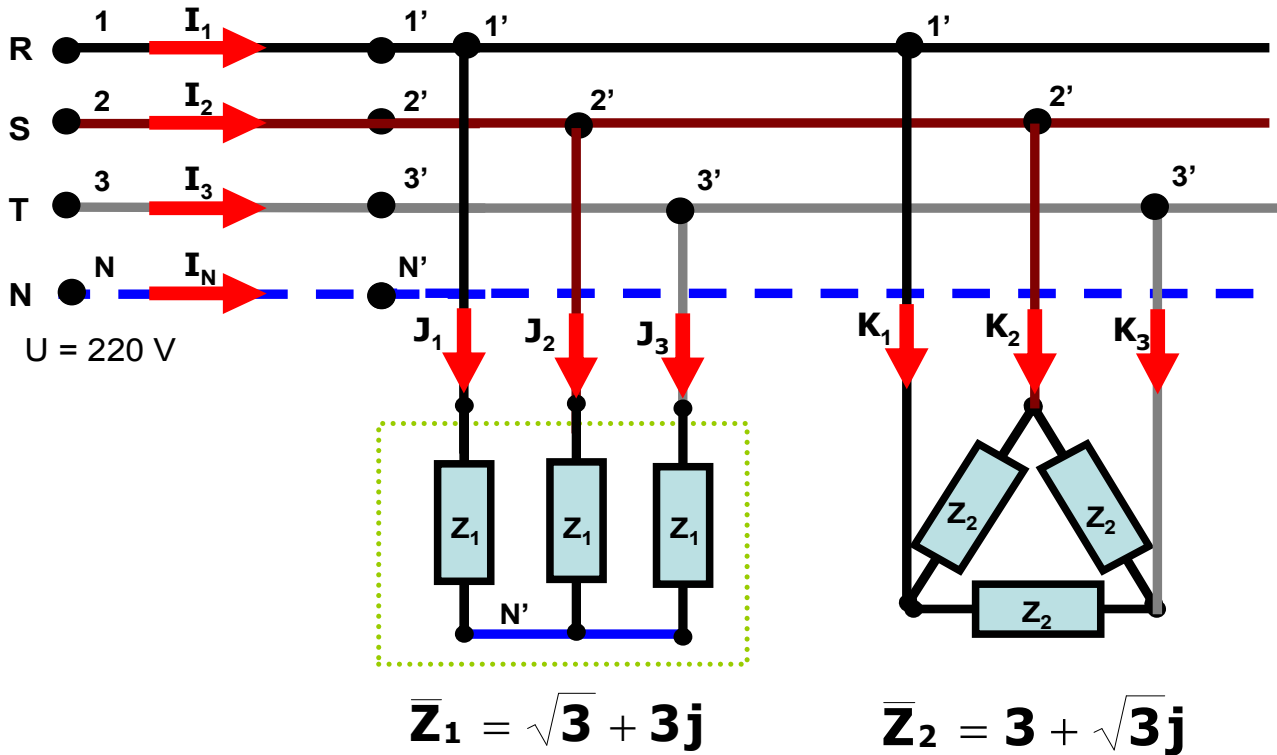


Ejercicio 1: Calcular las intensidades de línea.



2/3

Estrella equilibrada

- UL = 220 V
- UF = 127,0171 V
- R = 1,732051 Ω
- X = 3 Ω
- Z = 3,464102 Ω
- φ = 1,047198 rad
- φ = 60 °
- IF = 36,66667 A
- IL = 36,66667 A

Triangulo Equilibrado

- UL = 220 V
- UF = 220 V
- R = 3 Ω
- X = 1,7321 Ω
- Z = 3,4641 Ω
- φ = 0,5236 rad
- φ = 30 °
- IF = 63,509 A
- IL = 110 A

$$J_1 = 36,67 \angle 30,00^\circ = 31,75 + 18,33 j$$

$$J_2 = 36,67 \angle -90,00^\circ = 0,00 + -36,67 j$$

$$J_3 = 36,67 \angle -210,00^\circ = -31,75 + 18,33 j$$

$$K_1 = 110,00 \angle 60,00^\circ = 55,00 + 95,26 j$$

$$K_2 = 110,00 \angle -60,00^\circ = 55,00 + -95,26 j$$

$$K_3 = 110,00 \angle -180,00^\circ = -110,00 + 0,00 j$$

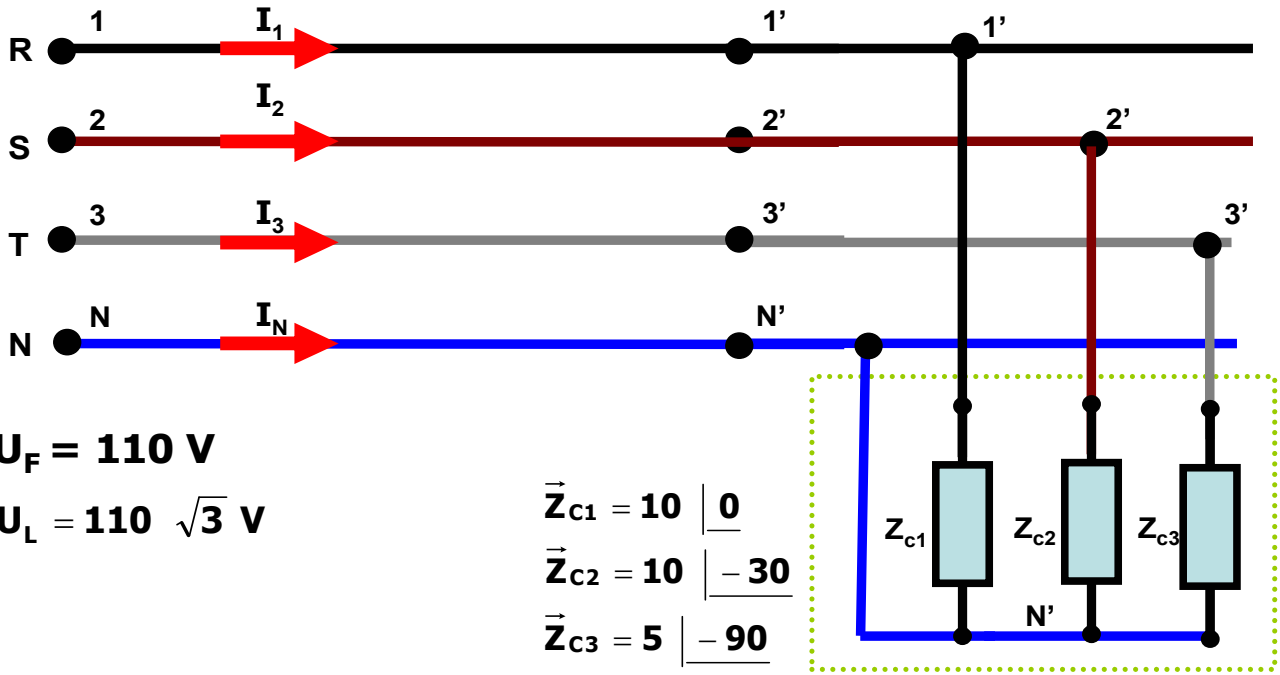
$$\begin{cases} \bar{I}_1 = \bar{J}_1 + \bar{K}_1 \\ \bar{I}_2 = \bar{J}_2 + \bar{K}_2 \\ \bar{I}_3 = \bar{J}_3 + \bar{K}_3 \end{cases}$$

$$I_1 = 142,93 \angle 52,63^\circ = 86,75 + 113,60 j$$

$$I_2 = 142,93 \angle -67,37^\circ = 55,00 + -131,93 j$$

$$I_3 = 142,93 \angle -187,37^\circ = -141,75 + 18,33 j$$

Ejercicio 2: Calcular las intensidades de línea.



Estrella desequilibrada con neutro $Z_{nn'} = 0$

$U_L = 173,205 \text{ V}$

$U_F = 100 \text{ V}$

	Modulo	Argumento	Real	Imaginario
Zc1	10,00	0,00	10,00	0,00
Zc2	10,00	-30,00	8,66	-5,00
Zc3	5,00	-90,00	0,00	-5,00

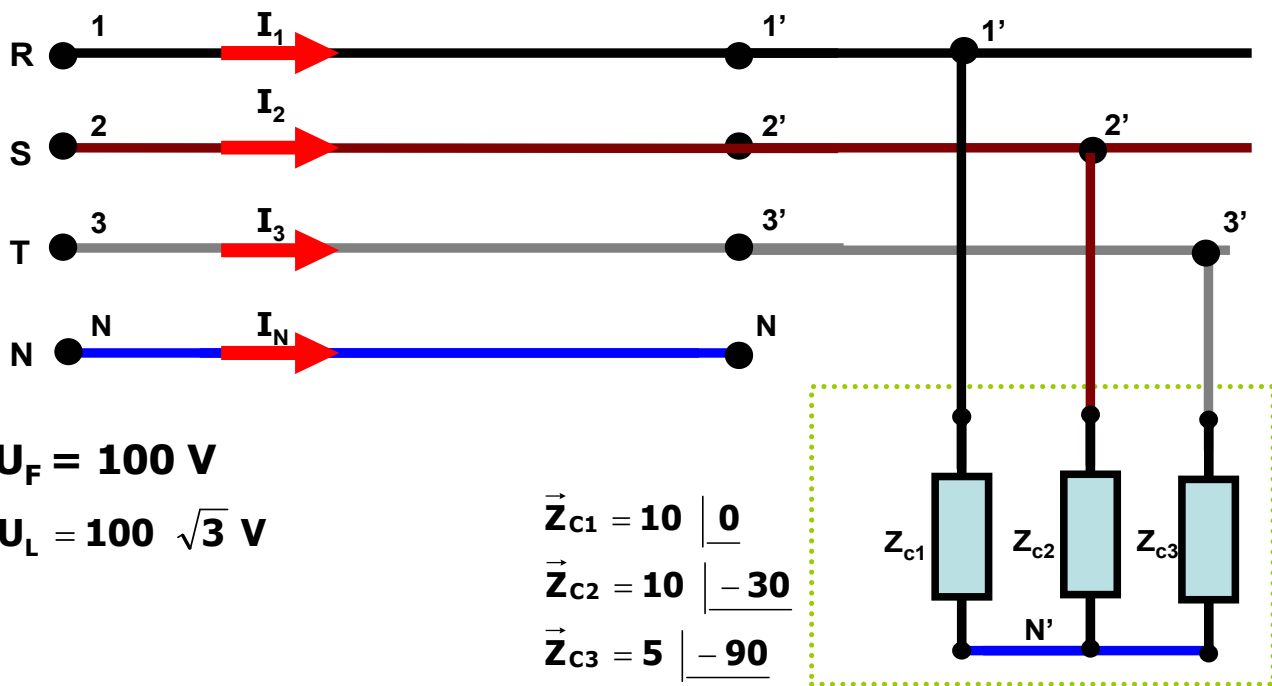
Tensiones simples
en la generación y
carga

	Modulo	Argumento	Real	Imaginario
$U_{n'n} =$	0,0000	0,0000	0,0000	0,0000
$U_{z1} = U_{1'N'} =$	100,0000	90,0000	0,0000	100,0000
$U_{z2} = U_{2'N'} =$	100,0000	-30,0000	86,6025	-50,0000
$U_{z3} = U_{3'N'} =$	100,0000	-150,0000	-86,6025	-50,0000

Intensidades
de línea

	Modulo	Argumento	Real	Imaginario
$I_{z1} = I_1 =$	10,0000	90,0000	0,0000	10,0000
$I_{z2} = I_2 =$	10,0000	0,0000	10,0000	0,0000
$I_{z3} = I_3 =$	20,0000	-60,0000	10,0000	-17,3205
$I_n =$	21,2976	159,8961	-20,0000	7,3205

Ejercicio 3: Calcular las intensidades de línea.



Estrella desequilibrada sin neutro

$U_L = 173,205 \text{ V}$

$U_F = 100 \text{ V}$

	Modulo	Argumento	Real	Imaginario
Zc1	10,00	0,00	10,00	0,00
Zc2	10,00	-30,00	8,66	-5,00
Zc3	5,00	-90,00	0,00	-5,00

Tensiones simples en la generación

	Modulo	Argumento	Real	Imaginario
E1 = U1N =	100,0000	90,0000	0,0000	100,0000
E2 = U2N =	100,0000	-30,0000	86,6025	-50,0000
E3 = U3N =	100,0000	-150,0000	-86,6025	-50,0000

Tensiones simples en la carga

$$\begin{cases} \bar{U}_{1'N'} = \bar{E}_1 - \bar{U}_{N'N} \\ \bar{U}_{2'N'} = \bar{E}_2 - \bar{U}_{N'N} \\ \bar{U}_{3'N'} = \bar{E}_3 - \bar{U}_{N'N} \end{cases}$$

	Modulo	Argumento	Real	Imaginario
Un'n =	68,2699	286,6341	19,5429	-65,4130
Uz1 = U1'N' =	166,5634	96,7380	-19,5429	165,4130
Uz2 = U2'N' =	68,8081	12,9441	67,0597	15,4130
Uz3 = U3'N' =	107,2586	171,7380	-106,1454	15,4130

Intensidades de Línea

$$\begin{cases} \bar{I}_1 = \bar{I}_{1'N'} = \bar{U}_{1'N'} / \bar{Z}_{c1} \\ \bar{I}_2 = \bar{I}_{2'N'} = \bar{U}_{2'N'} / \bar{Z}_{c2} \\ \bar{I}_3 = \bar{I}_{3'N'} = \bar{U}_{3'N'} / \bar{Z}_{c3} \end{cases}$$

	Modulo	Argumento	Real	Imaginario
Iz1 = I1 =	16,6563	96,7380	-1,9543	16,5413
Iz2 = I2 =	6,8808	42,9441	5,0369	4,6878
Iz3 = I3 =	21,4517	261,7380	-3,0826	-21,2291

Comprobacion: $I_1 + I_2 + I_3 = 0,00 \quad 0,00 \quad 0,00 \quad 0,00$