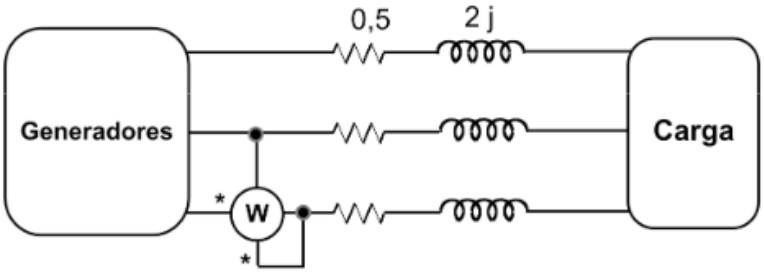
# Examen 11 enero 2018 - Trifásica.




$f = 50Hz$
$I = 39{,}67$ A
$Z_\Delta = 6{,}33 + 25{,}41j\Omega$
$\varphi = atg\frac{25{,}41}{6{,}33} = 76°$
$cos\varphi = 0{,}242$ inductivo

$Z_Y = 2{,}11 + 8{,}47j\Omega$
$P = 3 \cdot I^2 \cdot 2{,}11 = 9961{,}6$ W
$Q = 3 \cdot I^2 \cdot 8{,}47 = 39989$ var
$S = P + jQ = 41211{,}1 < 76°$ VA
$S_\lambda = 3V_F I_F^*$ ; $41211{,}1 < 76° = 3\boldsymbol{V_F} 39{,}67 < 76° \rightarrow \boldsymbol{V_F} = \frac{41211{,}1}{3 \cdot 39{,}67} = 346{,}3$ V

Entonces $\boldsymbol{V_{F\Delta}} = \boldsymbol{V_L} = 600 < 30°$ V

$S_G = S + S_L = 41211{,}1 < 76 + 39{,}67^2 \cdot 3 \cdot (0{,}5 + 2j) = 41211{,}1 < 76 + 9732{,}9 < 76$
$S_G = 50944 < 76°$ VA
$S_G = 3\boldsymbol{V_F}\boldsymbol{I_F^*} \rightarrow 50944 < 76 = 3 \cdot \boldsymbol{V_F} \cdot 39{,}67 < 76$ ; $\boldsymbol{V_{FG}} = 428{,}1 < 0°$ V ;
$\boldsymbol{V_{LG}} = 741{,}4 < 30°$ V

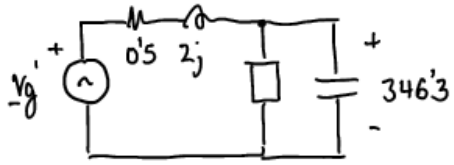
$\varphi' = \text{acos}\, 0{,}8 = 36\,,9°$

$C_\Delta = \frac{9961{,}6}{3} \cdot \frac{tg76 - tg36{,}9}{(346{,}3 \cdot \sqrt{3})^2 \cdot 100\pi} = 95{,}7\mu F$

$P = P' = \sqrt{3} \cdot V_L\, I_L' \cdot cos\varphi'$ W
$9961{,}6 = \sqrt{3} \cdot 600\, I_L' \cdot 0{,}8$
$I_L' = 12$ A $\rightarrow \boldsymbol{I_L'} = 12 < -36{,}9°$ A

Necesito la nueva tensión de línea del generador y su nuevo ángulo después de compensar.

$$W = V_{cb}\, I_c \cdot \cos\left(\hat{}_{V_{cb}I_C}\right) = V'_L I'_L \cdot \cos\left(\varphi'_G - 30\right)$$
$$\varphi'_G = 2{,}44 - (-36{,}9) = 39{,}4°$$




$$\boldsymbol{V'_g} = 346{,}3 + 12 < -36{,}9(0{,}5 + 2j) = 365{,}8 < 2{,}44°$$
$$\boldsymbol{V_{gl}} = 633{,}7 < 32{,}44°$$

Entonces $W = 633{,}7 \cdot 12 \cdot \cos(39{,}4 - 30) = 7503{,}6$ W

Diagrama fasorial de tensiones y corrientes en el generador.