Solución problema 2

MS1

Un.MS1	6000 V
fn.MS1	50 Hz
Sn.MS1	210 kVA
Xs.MS1	0.2 p.u.
E/i @ fn.MS1	1000 V/A

MS2

Un.MS2	400 V
fn.MS2	50 Hz
Sn.MS2	200 kVA
Xs.MS2	0.1 p.u.
E/i @ fn.MS2	100 V/A

T

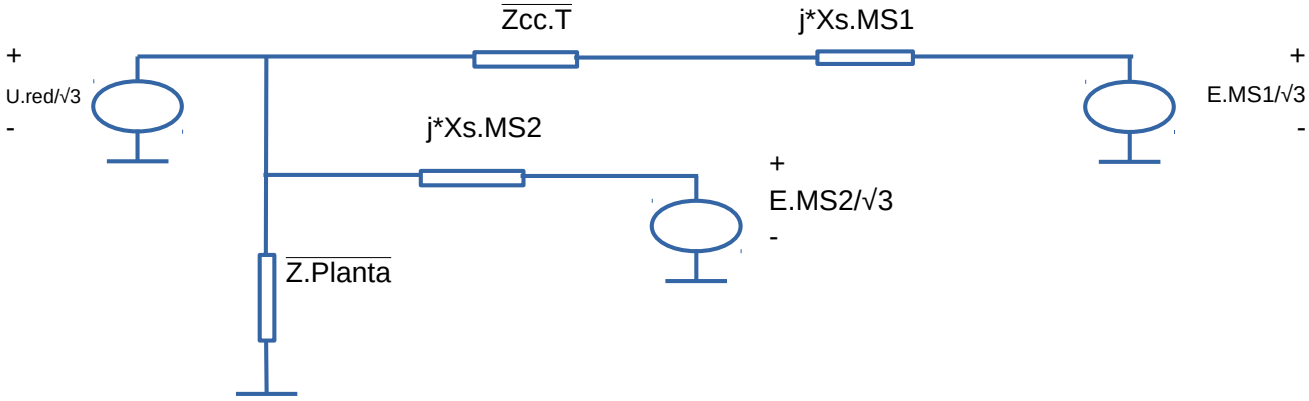
Upn.T	6.3 kV
Usn.T	0.4 kV
Sn.T	500 kVA
Uz.T	0.05 p.u.

U.red	0.4 kV

Planta

S.Planta	300 kVA
cos.Phi.Planta	0.8 i

parte (1) →



U.red 0.4 kV

Z.Planta = U.red² / S.Planta < ACOS(cos.Phi.Planta)
= (0.4kV)² / (300kVA) < ACOS(0.8)
0.426666666666667+0.32j Ohm
Rect: 0.4267+0.32j
Polar: 0.5333 < 36.87º

Zcc.T = (Uz.T * (Usn.T)² / Sn.T)*j
= (0.05p.u. * (0.4kV)² / 500kVA)*j
0.016j Ohm
Rect: 0.016j
Polar: 0.016 < 90º

j*Xs.MS1.6000 = (Xs.MS1 * (Un.MS1)² / Sn.MS1)*j
= (0.2p.u. * (6000V)² / 210kVA)*j
34.2857142857143j Ohm
Rect: 34.29j
Polar: 34.29 < 90º

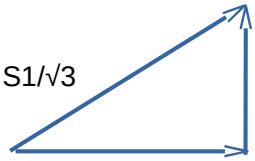
Xs.MS1.6000 34.29 Ohm

Xs.MS1 = Xs.MS1.6000 * (Usn.T / Upn.T)^2

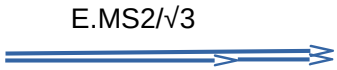
Xs.MS1 0.138 Ohm

j*Xs.MS2 = (Xs.MS2 * (Un.MS2)² / Sn.MS2)*j
= (0.1p.u. * (400V)² / 200kVA)*j
0.08j Ohm
Rect: 0.08j
Polar: 0.08 < 90º
Xs.MS2 **0.08 Ohm**

parte (2) →



P.MS1 200 kW
Q,MS1 0 KVAr
S.MS1 200 kVA
I.MS1 = S.MS1 / (√3*U.red)
= 200kVA / (√3*0.4kV)
288.7 A
E.400.MS1 = √3*√((U.red /√3)^2 + (I.MS1 * (Xs.MS1 + IM(Zcc.T)))^2)
407.4 V
E.400/i 63.49 V/A
i.MS1 **6.416 A**



In.MS2 = Sn.MS2 / (√3*U.red)
= 200kVA / (√3*0.4kV)
288.7 A
75% 216.5 A
E.MS2 = √3*(U.red/√3 + 0.75*In.MS2*Xs.MS2)
430.00 V
i.MS2 **4.300 A**

parte (3) →

P.generadores 200 kW
Q.generadores 150 kVAr
P.Planta 240 kW
Q.Planta 180 kVAr
P.a.la.red -40 kW
Q.a.la.red -30 kVAr
PF.visto.desde.red = COS(ATG(Q.a.la.red/P.a.la.red))
0.8 inductivo

parte (4) →

P.MS2 0 kW
Q.MS2 180 kVAr
S.MS2 180 kVA
I.MS2 = S.MS2 / (√3*U.red)
= 180kVA / (√3*0.4kV)
259.8 A
E.MS2 = √3*(U.red/√3 + I.MS2*Xs.MS2)
436.0 V
i.MS2 **4.360 A**