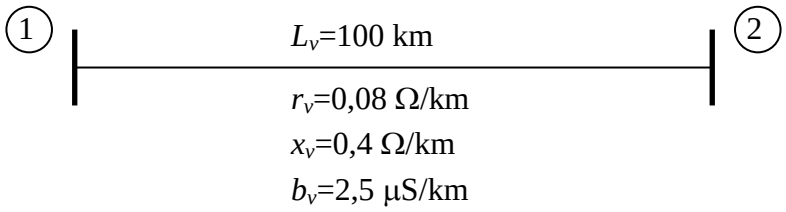
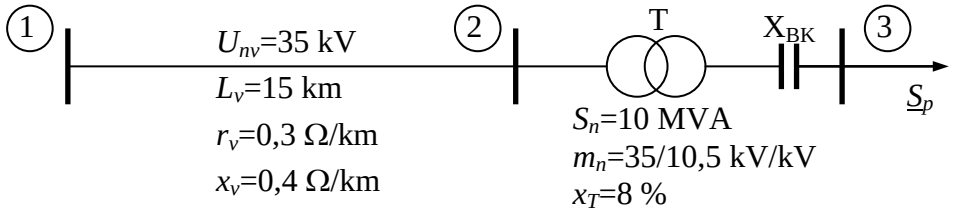
ELEKTRIJADA 2007: POWER SYSTEM ANALYSIS

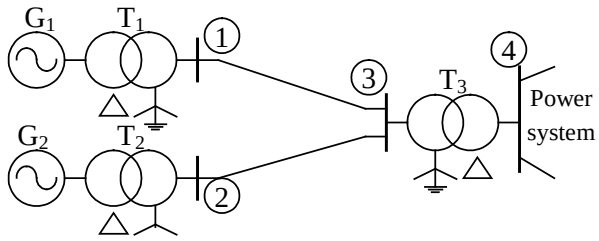
1. Transmision line is shown on figure. Voltage at bus 2 are $\underline{U_2}$=220 kV /0°. Consumption at end of line are $\underline{S_2}$=(100+j50) MVA. Using "π" model of line find active and reactive power at beginning of line, transfer loss and voltage at bus 1.



2. Power system, shown on the figure, suply consumtion area with constant power $\underline{S_p}$=(5+j3) MVA. Voltage magnitude at bus 1 is U_1=36 kV. With serial capacitor bank near bus 3 voltage magnitude at bus 3 is U_3=10,5 kV. Find reactance and reactive power of serial capacitor bank.



3. Simply power system is shown on the figure. In the case of single phase to ground fault at bus 3 find phase current on line 2-3.
Voltage at bus 3 before fault was U_{3fr}=1 r.j.



System data are (r.j.):

$G_1 \equiv G_2$:	$X_d=X_i=0,14$	$X_o=0,05$
$T_1 \equiv T_2$:	$X_d=X_i=0,06$	$X_o=0,06$
$V_{13} \equiv V_{23}$:	$X_d=X_i=0,1$	$X_o=0.3$
T_3:	$X_d=X_i=0,05$	$X_o=0,05$
P. System:	$X_d=X_i=0,02$	$X_o=0,05$

4. For nesimetrical system are known: $\underline{I_A}$=1,0 r.j. /0°; $\underline{I_B}$=0,5 r.j. /-120°; $\underline{I_d}$=2/3 r.j. Find phase *C* current and unknown simetrical coponent and draw vector diagrams for all three symetrical systems.

5. Simply power system is given on the figure. Find elements of Jacobian matrix at zero iteration of Newton-Raphsons method for load flow calculation.