

IV B.Tech I Semester Supplementary Examinations, November 2006
COMPUTER METHODS IN POWER SYSTEMS
(Electrical & Electronic Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) Explain the load flow solution using G-S method with the help of a flow chart.
 (b) How do you classify system variables in terms of state, input and output variables, in power flow studies. [12+4]
2. Find δ_2 and Q_2 for the system shown in figure2 use. N.R. method upto one iteration.

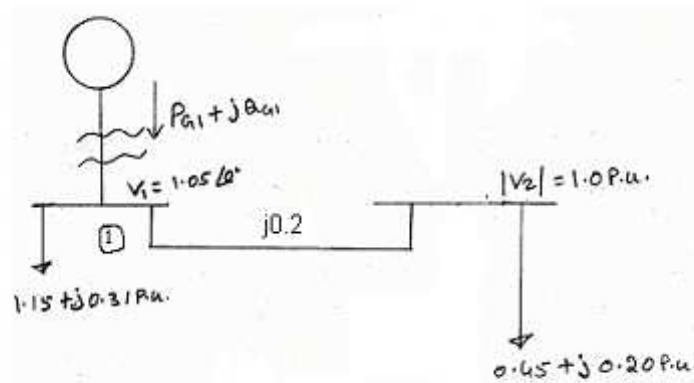


Figure 2

[16]

3. Explain clearly with a detailed flow chart the computational procedure for load flow solution using decoupled method deriving necessary equations. [16]
4. (a) Briefly explain the importance of three phase symmetrical fault analysis of a power system. State the reasons for change of fault current with time and its effect on breaker capacity.
 (b) Three 6.6 KV generators A,B and C of rating 40,50 and 25 MVA capacity respectively are connected to a common bus bar. A current limiting reactor of 12% is connected between each generator and the common bus. Each generator has a leakage reactance of 10% based on its rating. The generators are developing rated voltage on no load. If a symmetrical three phase fault occurs at the terminals of machine, calculate maximum MVA of the breaker at the fault point. Choose 50 MVA as base. [8+8]
5. The reactances of the various components are as follows.
 $G1=0.2$ p.u: $G2=0.25$ p.u: $T1=0.1$ p.u: $T2=0.1$ p.u:
 Line 1 - 2 = 0.08 p.u:

Line 2 – 3 = 0.06 p.u:

Line 1 – 3 = 0.1 p.u

Compute fault current in the lines for a three phase short-circuit at bus 3. $Z_f=0$. Use Z-bus matrix in your calculations as shown in the figure5.

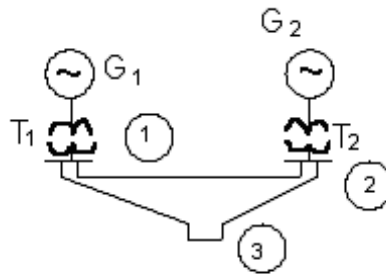


Figure 5

[16]

6. (a) Define the following terms :
 - i. Steady state stability limit.
 - ii. Dynamic state stability limit.
 - iii. Transient state stability limit .
- (b) List the assumptions made in the transient stability solution techniques.
- (c) Derive the expression for steady state stability limit using ABCD parameters. [2+2+2+4+6]

7. (a) Write a short notes on methods of improving stability of power system.
- (b) A generator operating at 50Hz delivers 1 p.u. power to an infinite bus through a transmission circuit in which resistance is neglected. A fault takes place reducing the maximum power transferable to 0.3 p.u. where as before the fault this power was 2.0 p.u. and after the clearance of the fault it is 1.5 p.u.. By the use of equal area criterion determine the critical clearing angle. [8+8]

8. (a) What are the factors that affect transient stability?
- (b) What are the methods used to improve the transient stability limit?
- (c) Write some of the recent methods for maintaining stability. [6+6+4]
