EE72

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NEW SCHEME

Seventh Semester B.E. Degree Examination, Dec.06/Jan. 07
Electrical & Electronics
Computer Techniques in Power Systems

Time: 3 hrs.] [Max. Marks:100

Note: *1. Answer any FIVE questions.*
2. Assume any missing data suitably.

1 a. Explain the significance of primitive network and hence get the performance equations in both impedance and admittance form. **(05 Marks)**

b. Derive an expression for obtaining the bus admittance matrix using singular transformations. **(07 Marks)**

c. Determine the bus admittance matrix using the singular transformations for the sample power system with the line data shown in table below. **(08 Marks)**

LINE NO.	1	2	3	4	5
BUS CODE p - q	0-1	1-2	2-3	3-0	2-0
Impedance in p.u.	0.8	0.5	0.4	0.5	0.25

2 a. Obtain the generalized algorithmic expression for Bus impedance matrix elements when a LINK is added to the partial network. Also discuss the special cases. **(14 Marks)**

b. Explain the steps to modify the Z_{BUS} for removal of a line or modification of the line impedance. **(06 Marks)**

3 a. What are different types of buses considered during power system load flow analysis? Explain briefly. **(05 Marks)**

b. Determine the voltages at the end of first iteration using Gauss seidal method for the system data given below. Assume the acceleration factor $\alpha = 1.6$. **(15 Marks)**

i) LINE DATA

Bus Codes	Admittance
1 – 2	2 – j 8.0
1 – 3	1 – j 4.0
2 – 3	0.666 – j 2.664
2 – 4	1 – j 4.0
3 – 4	2 – j 8.0

ii) BUS DATA

BUS NO	P	Q	V	REMARK
1	-	-	1.06 ∠0	SLACK
2	0.5	0.2	1 + j 0.0	PQ
3	0.4	0.3	1 + j 0.0	PQ
4	0.3	0.1	1 + j 0.0	PQ

4 a. Solve the non linear equations using Newton Raphson method for 2 iterations
$Y^2 - 4x - 4 = 0$
$2y - x - 2 = 0$. Assume initial values $x^{(0)} = -1$, $y(0) = 1$. **(10 Marks)**

b. Explain with the help of a flow chart Newton Raphson method of load flow analysis in a power system. **(10 Marks)**

5 a. The fuel costs per hour for plants 1 and 2 are given by
$F_1 = 0.2\ P_1^2 + 40\ P_1 + 120$ Rs /Hr.
$F_2 = 0.25\ P_2^2 + 30P_2 + 150$ Rs/Hr.
Determine the economic operating schedule and the corresponding cost of generation if the maximum and minimum loading on each unit is 100 MW, and 25 MW, the demand is 180 MW and the transmission losses are neglected. If the load is equally shared by both units, determine the saving obtained by loading the units as per equal incremental production cost. **(10 Marks)**

b. What are transmission line loss coefficients? Obtain the general expression B_{mn} with usual notations. **(10 Marks)**

6 a. What is Load Frequency Control? Explain with a block diagram model of load frequency control for an isolated power system. **(10 Marks)**

b. Explain the basic concepts of TWO interconnected control areas in LFC, with relevant block diagram models and equations. **(10 Marks)**

7 a. With the help of a block diagram explain simplified representation of a speed governor. **(08 Marks)**

b. With the help of a flow chart and equations explain the Transient Stability analysis using Modified Euler Method. **(12 Marks)**

8 Write brief notes on any four :
a. Representation of Tap changing of Transformers in load flow studies.
b. Automatic voltage regulators.
c. Runge Kutta method for Transient stability analysis.
d. Representations of synchronous machines for Transient stability analysis.
e. Fast Decoupled Load flow analysis. **(20 Marks)**

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