

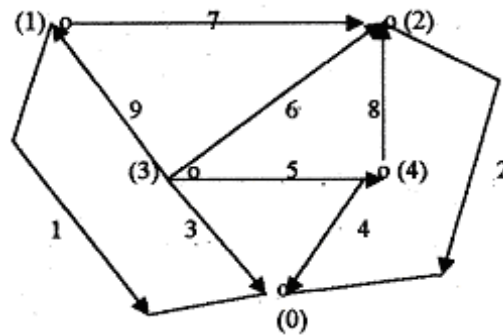
III B.Tech II Semester Supplementary Examinations, April/May 2005
MODELING AND POWER SYSTEMS COMPONENTS
(Electrical & Electronic Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) What is the element node incidence matrix \hat{A} ? And what are the elements of this matrix? What is the dimensions of this matrix \hat{A} ?
 (b) What is bus-incidence matrix A ? And what is the dimensions of this matrix?
 (c) For the graph shown below, write down A and \hat{A} matrices.
2. (a) Derive the expression for bus admittance matrix Y_{Bus} in terms of primitive admittance matrix and bus incidence matrix.
 (b) Find the Y Bus using singular transformation for the system shown in figure below



$$\text{and } Y = \text{dia} [Y_{10} \ Y_{20} \ Y_{30} \ Y_{40} \ Y_{34} \ Y_{23} \ Y_{12} \ Y_{24} \ Y_{13}]$$

3. (a) Describe the algorithm for formation of bus impedance matrix for addition of a branch.
 (b) Describe the algorithm for formation of bus impedance matrix for addition of a link.
4. Describe the method of Y_{bus} formation by direct inspection and by singular transformation. Bring out the advantages of Y_{bus} over Z_{bus} with suitable examples.
5. Develop the expressions for formation of three phase Z_{BUS} for the element which is added between two existing buses in a partial network.
6. A synchronous generator is connected to an infinite bus through a transmission line. Neglecting the resistances draw the phasor diagram and derive the
 - (a) Relation between active power and power angle.
 - (b) Relation between reactive power and power angle.

7.
 - (a) Develop the mathematical model of hydraulic value actuator in speed governing system.
 - (b) Two generators rated 200Mw and 400Mw are operating in parallel. The droop characteristics of their governors are 4% and 6% respectively from no-load to full-load. Assuming that the generator are operating at 50Hz, how a load of 500Mw be shared between them.
8. Write short notes on:
 - (a) Error Amplifier
 - (b) Rate stabilizer
 - (c) Exciter Modeling.

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