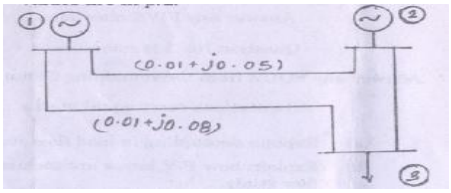
ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES

Department of Electrical & Electronics Engineering

IV/IV B. Tech, Semester-II

POWER SYSTEM OPERATION AND CONTROL

ASSIGNMENT-I

<table>
<tr><td>1</td><td></td><td>Compare the relative merits and demerits of different load flow solution methods.</td><td>CO1</td></tr>
<tr><td>2</td><td></td><td>State the load flow problem and develop a fast decoupled load flow model. Clearly explain various assumptions involved.</td><td>CO1</td></tr>
<tr><td>3</td><td></td><td>In a 3-bus system each bus is connected via three lines with series impedance of (0.025+j0.085) p.u and half line charging admittance 0.001p.u. The quantities specified at various buses are specified below. Obtain the load flow solution at the end of one iteration by (i) Decoupled and (ii) Fast Decoupled Load Flow (FDLF) method. All values are in p.u.
<table>
<tr><th>Bus No.</th><th>Bus type</th><th>P_G</th><th>Q_G</th><th>P_L</th><th>Q_L</th><th>Voltage</th></tr>
<tr><td>1</td><td>slack</td><td>-</td><td>-</td><td>2.0</td><td>1.0</td><td>1.05</td></tr>
<tr><td>2</td><td>PQ</td><td>-</td><td>-</td><td>1.5</td><td>0.6</td><td>1.00</td></tr>
<tr><td>3</td><td>PV</td><td>0.5</td><td>-</td><td>-</td><td>-</td><td>1.05</td></tr>
</table></td><td>CO1</td></tr>
<tr><td>4</td><td></td><td>Perform one-iteration of FDLF method for the system shown in figure below. All values are in p.u.
Slack bus-1: V = 1.05+j 0.0
P - V bus-2: $|V2|$=1.03 p.u; $P2$ = 0.5 p.u; 0.1 < $Q2$ > 0.3.
Load bus - 3: $P3$ = 0.6 p.u; $Q3$ = 0.25 p.u.
 
</td><td>CO1</td></tr>
<tr><td>5</td><td></td><td>Write briefly about application of sparse techniques to load flow models.</td><td>CO1</td></tr>
<tr><td rowspan="2">6</td><td>a</td><td>Show that maximum economy is obtained in a power system consisting of only thermal Stations when the incremental fuel costs of all stations are equal, neglecting transmission losses.</td><td>CO2</td></tr>
<tr><td>b</td><td>What is Unit Commitment (UC)? What are the constraints considered and explain? Give the list of solution techniques for UC.</td><td>CO2</td></tr>
</table>

7		A generating station has three units having the following incremental fuel costs in Rs/MWh.IC1 =0.25P1 +60; IC2=0.2 P2+45 and IC3=0.3P3+75. All the units operate all the time and the Permissible minimum and maximum loads on each unit are 50 MW and 225 MW respectively. For a total load of 400 MW on the station, determine the most economical operation, the power to be generated by each machine.	**CO2**
8		Derive the necessary conditions for optimal load sharing of load among generators when the transmission losses are taken into account. Explain the computational procedure with the help of a flow chart.	**CO2**
9	a	The following incremental costs pertain to a two unit system. IC1 = 0.03P1 + 14 Rs/MWh ; IC2 = 0.04 P2+ 10 Rs/MWh The loss coefficients are B11 =0.00lMW-1, B12= B22=0.1f λ for the system is Rs. 30 MW-hr; Compute the required generation at the two plants and the loss in the system.	**CO2**
	b	Explain hydrothermal scheduling with necessary equations.	**CO2**
10		Derive the expression for transmission loss formula using B- coefficients.	**CO2**