Military Institute of Science and Technology (MIST)
Dept. of Electrical, Electronic and Communication Engineering
EECE 306: Power System Laboratory
Open Ended Lab Project

Fig. 1 shows a 5-bus power system. Table 1 and Table-2 are the bus data and transmission line data based on 10 kV base. Consider Bus-1 as the swing bus.

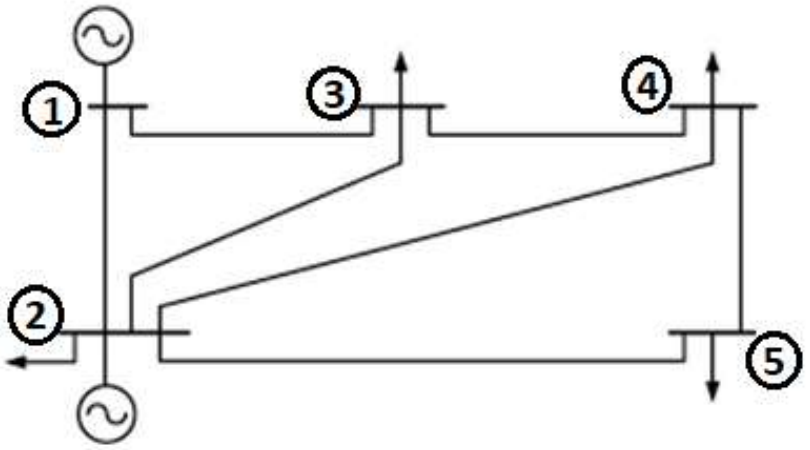

Fig. 1

Table-1: Bus Data

Bus No	Bus Voltage	Generation		Load	
		MW	MVar	MW	MVar
1	1.06+j0.0	0	0	0	0
2	1.0+j0.0	40	30	20	10
3	1.0+j0.0	0	0	45	15
4	1.0+j0.0	0	0	40	5
5	1.0+j0.0	0	0	60	10

Table-2: Transmission Line Data

Line	Line Impedance		Line Charging
	R per unit	X per unit	
1-2	0.02	0.06	0.0+j0.03
1-3	0.08	0.24	0.0+j0.025
2-3	0.06	0.25	0.0+j0.02
2-4	0.06	0.18	0.0+j0.02
2-5	0.04	0.12	0.0+j0.015
3-4	0.01	0.03	0.0+j0.01
4-5	0.08	0.24	0.0+j0.025

Tasks:

1. Perform load flow studies of the power system of Fig. 1 to identify slack bus (Bus no. 1) power and bus voltages (Bus no. 2 to Bus no. 3). Compute line flows and line losses also. [**Use ETAP simulation software**]
2. Verify the results obtained in Task no. 1 by writing a **Matlab code** adopting any load flow analysis method.
3. Make an under voltage event in Bus-4 and apply any technique to overcome the under voltage problem of the system. (Consider, below 85% to be undervoltage for any bus) .
4. Initiate an unsymmetrical fault (L-G, L-L-G, L-L) in the transmission lines. Group-1 initiate fault in line 1-3, Group-2 initiate fault in line 2-3, Group-3 initiate fault in line 2-4 and Group-4 initiate fault in line 2-5. Observe the change in the results of the load flow studies after the fault initiation.

Submission Guidelines:

- The report should be types in .docx file using font: Times new roman, font size: 12.
- Writing should be justified properly.
- Reference should be provided in case of copying any content from internet/book/conference paper/journal article.
- Page limit: 10-15 pages. Don't cross 15 pages.
- Report must start with:
  - ✓ Cover Page: Project Name, Course Code and Course Title, MIST logo.
  - ✓ Next Page: Group Number and Name of the group members.
- Report must be both side colour printed with spiral binding.
- The results of 4 different tasks should be presented separately in different sections with necessary code/diagram/data table etc.
- Preserve softcopy of the simulation file and students must run the simulation during evaluation to validate his/her analysis.
- A 5 minutes video submission has to be provided by each groups showing the simulation and results.
- On the day of report submission, each group member has to sit for a viva explaining the methodology and results of the assigned tasks