EE 552: POWER & ENERGY SYSTEMS SIMULATION LAB   (0-0-6: 3)

Group A - POWER SYSTEM SIMULATION LABORATORY

Suggested List of Experiments

1. Formation of Y_{bus} by Singular transformation and inspection methods.
2. Z_{bus} formulation using building algorithm.
3. Software development for load flow analysis by Gauss Seidel method and Newton Raphson method.
4. Software development for load flow analysis by Decoupled and Fast Decupled methods.
5. Software development for AC-DC load flow analysis.
6. Simulation of symmetrical fault level analysis of a multi-bus power system.
7. Simulation of unsymmetrical fault level analysis of a multi-bus power system.
8. To develop software for transient stability study of single machine infinite bus system incorporating the line opening and closing, or fault removal features.
9. To simulate single machine infinite bus system incorporating the line opening and closing, or fault removal features, for transient stability studies.
10. Contingency analysis using Network sensitivity and AC power flow methods.
11. To design and study the dynamic performance of an isolated thermal hydro system
12. To formulate & design the two-area dynamic models of interconnected hydro-thermal system under deregulated environment.
13. To construct a simulink model of AVR system and study its terminal voltage step response.

Group B - POWER ELECTRONICS & DRIVES SIMULATION LABORATORY

Suggested List of Experiments

1. Study on the'd-q-0' transformation in various frames of reference.
2. Study of 1-phase controlled rectifier for R-L load.
3. Study of 3-phase controlled rectifier for R-L load.
4. Dynamic response study of dc motor drive fed by controlled rectifier.
5. Dynamic response study of dc motor drive fed by dc-dc converter.
6. Study on SPWM scheme for a 3-phase VSI.
7. Study on SVM scheme for a 3-phase VSI.
8. Dynamic performance of an induction motor during a 3-phase fault at the machine terminals.
9. Dynamic performance of synchronous machine using'd-q-0'model during a sudden change in torque.
10. Study of resonant converter.

Group C - INSTRUMENTATIONS & CONTROL LABORATORY

Suggested List of Experiments

1. Study of Digital Control System hard ware with observation of performance in CRO- design and test of PID control algorithms.
2. MATLAB implementation of state estimator based closed loop control system with estimator gain design and control law design.
3. Familiarization with fuzzy logic controller implementation using MATLAB SIMULINK.

4. Simulation and stability analysis of control system with common non-linearities.
5. Performance analysis of non-linear electrical circuit using phase plane method.
6. Design of optional regulator using MATLAB.
7. MATLAB-SIMULINK based design of discrete time control system.
8. Familiarization with robust control system in MATLAB environment.