

AMEE18 POWER SYSTEM ANALYSIS

UNIT-1 REPRESENTATION OF POWER SYSTEM COMPONENTS:

- 1.1 Synchronous machines, Transformers,
- 1.2 Transmission lines, One line diagram,
- 1.3 Impedance and reactance diagram, per unit System
- 1.4 Symmetrical components: Symmetrical Components of unbalanced phasors,
- 1.5 Power in terms of symmetrical components,
- 1.6 Sequence impedances and sequence networks.
- 1.7 Symmetrical fault analysis: Transient in R-L series circuit,
- 1.8 Calculation of 3-phase short circuit current and reactance of synchronous machine,
- 1.9 Internal voltage of loaded machines under transient conditions

UNIT-2 UNSYMMETRICAL FAULTS:

- 2.1 Analysis of single line to ground fault, line-to-line fault and Double Line to ground fault on an unloaded generators and power system network with and without fault impedance.
- 2.2 Formation of Zbus using singular transformation and algorithm,
- 2.3 Computer method for short circuit calculations

UNIT-3 LOAD FLOWS

- 3.1 Introduction, bus classifications, nodal admittance matrix (YBUS), development of load flow equations, load flow solution using Gauss Siedel and Newton-Raphson method,
- 3.2 Approximation to N-R method, line flow equations and fast decoupled method

UNIT-4 POWER SYSTEM STABILITY

- 4.1 Stability and Stability limit, Steady state stability study,
- 4.2 Derivation of Swing equation, transient stability studies by equal area criterion and step-by-step method.
- 4.3 Factors affecting steady state and transient stability and methods of improvement

UNIT-5 TRAVELING WAVES

- 5.1 Wave equation for uniform Transmission lines,
- 5.2 Velocity of propagation, surge impedance,
- 5.3 Reflection and transmission of traveling waves under different line loadings.
- 5.4 Bewlay's lattice diagram,
- 5.5 Protection of equipment's and line against traveling waves

Reference Books:

1. L. P. Singh; "Advanced Power System Analysis & Dynamics", New Age International
2. Hadi Sadat; "Power System Analysis", Tata McGraw Hill.
3. D. Das, "Electrical Power Systems" New Age International, 2006.
4. J.D. Glover, M.S. Sharma & T.J. Overbye, "Power System Analysis and Design" Thomson, 2008.