

Power system dynamics & Control[New]

EE801B

Credit: 3

Module-1

Modeling of Power System Components: Modeling of a synchronous generator along with its components(exciter and turbine), Modeling of a regulating transformer, three phase modeling, modeling of three phase single circuit transmission line, modeling of a pair of three phase mutually coupled transmission line, modeling of shunt capacitor and inductor, modeling of a series capacitor, modeling of an induction motor, modeling of a series capacitor, modeling of a SVC, power network modeling, modeling of a load.

Module-2

Reactive Power Flow and Voltage Control Problems: Reactive power-voltage coupling concept, reactive power and voltage regulation, load bus reactive power sensitivity, effect of series reactive loss, reactive power requirement for control of voltage in long lines, concept of voltage stability and system voltage expression, stability margins, fundamental aspects of analysis of power system voltage stability static and dynamic analysis, QV operation of on load tap changer in voltage stability, load flow and voltage stability, voltage security, magnitude and power angle of receiving end bus voltage at voltage stability limit.

Module-3

Power System Compensation and FACTS Devices; Load compensation, line compensation, passive compensation – static shunt capacitor and reactor, uniformly distributed shunt compensation, shunt compensation at middle of the line using dynamic compensator, series capacitor compensator, comparison between shunt and series compensation, FACTS controllers, (series type, shunt type, combined shunt and series type FACTS controller), advantages of FACTS devices.

Module-4

Small Signal Stability and Subsynchronous Resonance: Introduction, stability of a dynamic system, modes of oscillation, mechanism of tie line oscillator, small signal stability of a single machine on infinite bus (SMIB), modeling of small signal stability, effect of exciter on small signal stability, SSR in series compensated systems, modeling and analysis of mechanical system and analogy with electrical system, countermeasures to SSR.