AMP-22 POWER SYSTEM RELIABILITY

UNIT-1 THE STABILITY PROBLEM

1.1 Definitions and illustrations of terms, Multimachine systems,

1.2 A mechanical analogue of system stability, Bad effects of instability, Scope of this book, Historical review.

UNIT-2 THE SWING EQUATION AND ITS SOLUTION

2.1 Review of the laws of mechanics; translation, Rotation, The swing equation, The inertia constant,

2.2 Point-by-point solution of the swing equation, Assumptions commonly made in stability studies.

UNIT-3 SOLUTION OF NETWORKS

3.1 The impedance diagram (positive-sequence*network), per-unit quantities, Representation of large synchronous machines, Transmission lines and cables,

3.2 Representation of loads, representation of faults, Miscellaneous equipment, Representation of remote of the system, Check list of data required for transient-stability study,

3.3 The alternating-current calculating board, Description of General Electric A-C, Network Analyzer, Procedure for using calculating board,

3.4 Algebraic solution of networks: determination of terminal admittances, Algebraic solution of networks:

3.5 Network reduction, Repeat steps 3 and 4 until all nodes except the terminals have been eliminated,

3.6 Determination of initial operating conditions, Network reduction by use of calculating board, combining machines, Treatment of synchronous condensers.

UNIT-4 THE EQUAL-AREA CRITERION FOR STABILITY

4.1 Applicability of the equal-area criterion, One machine swinging with respect to an infinite bus, The power-angle equation,

4.2 Applications of the criterion, two finite machines, Reactance network, Determination of swing curve by graphical integration.

UNIT-5 FURTHER CONSIDERATION OF THE TWO-MACHINE SYSTEM

5.1 Pre-calculated swing curves, Effect of fault-clearing time on transient stability limit,

5.2 Summary of methods of calculating transient stability, certain factors affecting stability.

UNIT-6 SOLUTION OF FAULTED THREE-PHASE NETWORKS

6.1 Symmetrical components, Sequence impedances, The sequence networks, Representation of short circuits by connections between the sequence networks, Fault shunts,

6.2 Effect of type of fault on stability, Effect of fault impedance, Unsymmetrical open circuits and series impedances, Simultaneous faults and other double unbalances,

6.3 The zero-sequence network, Representation of lines in the zero-sequence network, Representation of transformers in the sequence networks,

6.4 Effect of grounding on stability, Two-phase coordinates.

UNIT-7 TYPICAL STABILITY STUDIES

7.1 Description of systems, Fault locations, Swing curves, Stability during load condition I: faults on 132-kV. System of company A, Study of proposed changes at station BB,

7.2 Faults on the 44-kv, system of company A, Faults on the 44-kv. Line between stations BE and BG, Faults on 44-kv, line between stations BG and BH, Stability during load condition 2,

7.3 Proposed interconnecting lines, Scope of the study, Loads, Method of determining power limits,

7.4 Simplification of systems, Swing curves, part 1, Power-angle curves, part 2, and Staged-fault tests.

Reference Book:

1. Power system operation and control, Publisher Katsons, Writer K Nisha