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,

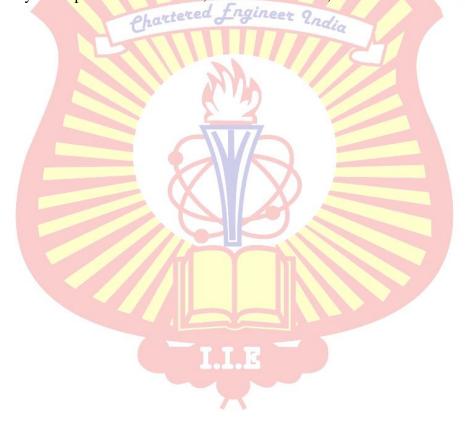
- 6.3 The zero-sequence network, Representation of lines in the zero-sequence network, Representation of transformers in the sequence networks,
- 6.4 Effect of grounding on stability, Two-phase coordinates.

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



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