EE518: POWER SYSTEM RELIABILITY (3-0-0: 3)

Generating System Reliability Analysis

Generation system model, Capacity outage probability tables, Recursive relation for capacitive model building, Sequential addition method, Unit removal, Evaluation of loss of load and energy indices

Frequency and Duration methods

Evaluation of equivalent transitional rates of identical and non-identical units – Evaluation of cumulative probability and cumulative frequency of non-identical generating units, Merging generation and load models

Operating Reserve Evaluation

Basic concepts, Risk indices, PJM methods, Security function approach, Rapid start and hot reserve units, Modeling using STPM approach

Bulk power System Reliability Evaluation

Basic configuration, Conditional probability approach, System and load point reliability indices, Weather effects on transmission lines, Weighted average rate and Markov model, Common mode failures.

Interconnected System Reliability Analysis

Probability array method, Two inter connected systems with independent loads, Effects of limited and unlimited tie capacity, Imperfect tie – Two connected Systems with correlated loads, Expression for cumulative probability and cumulative frequency

Distribution System Reliability Analysis

Radial networks: Introduction, Evaluation of Basic reliability indices, Performance indices – load point and system reliability indices – Customer oriented, loss and energy oriented indices

Parallel and Meshed Networks

Introduction, Basic evaluation techniques, Bus bar failures, Scheduled maintenance, Temporary and transient failures, Weather effects and Breaker failures.

Text Books and References

1. B. Roy and A.N. Ronald, “Reliability Evaluation of Power Systems”, Springer Publications
2. J. Endrenyi, “Reliability Modeling in Electric Power Systems”, John Wiley and Sons.