SNS COLLEGE OF TECHNOLOGY

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COIMBATORE-35
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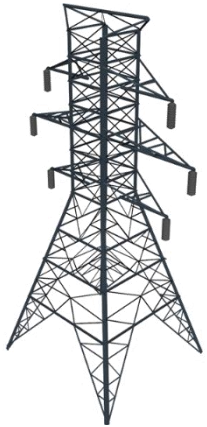
UNIT IV: UNIT COMMITMENT AND ECONOMIC DISPATCH

TOPIC: Unit commitment



Introduction

In power systems, demand variation is associated with human activities. Load is always light during night hours and it starts increasing right from morning and usually readies its peak level in the evening, and again falls during late evening period.

- The demand is also affected during weekends as well as by weather. Hence, many methods have been developed for load forecasting.
- The methods for load forecasting can predict the load for period varying from as small as few seconds to days. Based on these load forecasts, the usual practice is to prepare a commitment schedule of start-up and shut-down of units.
- The commission of a generating unit means to bring it to speed, synchronize it to the system and then connect it to the system so that it can deliver the load reliably.
- In the early stages, the main criteria of unit commitment were efficiency of units. Units used to be ordered as per efficiencies.
- The most efficient unit used to be committed first and then the next unit, if necessary to meet the load demand, from priority list used to be committed.
- Soon, it was realized that optimum unit commitment may be obtained using input output characteristics, termed as cost curves; and today all commitment techniques are based on these cost curves.
- Classically, unit commitment is the determination of optimal schedule and generation level of each unit over a specific time horizon. Time horizon may be hours or a week.

Unit Commitment Problem

The unit commitment problem (UC) in electrical power production is a large family of mathematical optimization problems where the production of a set of electrical generators is coordinated in order to achieve some common target, usually either match the energy demand at minimum cost or maximize revenues from energy production.

CONSTRAINTS IN UC

- Spinning reserve
- Static reserve
- Thermal Unit Constraints
- Fuel Constraints
- Must Run Units
- Must-off Units
- Emission Constraints

Unit commitment solution Methods

The Unit commitment problems are very difficult to solve, for that consider the following situation,

1. A loading pattern for the M periods using load curve must be established.

2. Number of units should be committed and dispatched to meet out the load.

3. The load period and number of units should supply the individual loads and any combination of loads.

CLASSICAL APPROACHES

There are many classical approaches have been developed and implemented successfully. Some of the approaches are

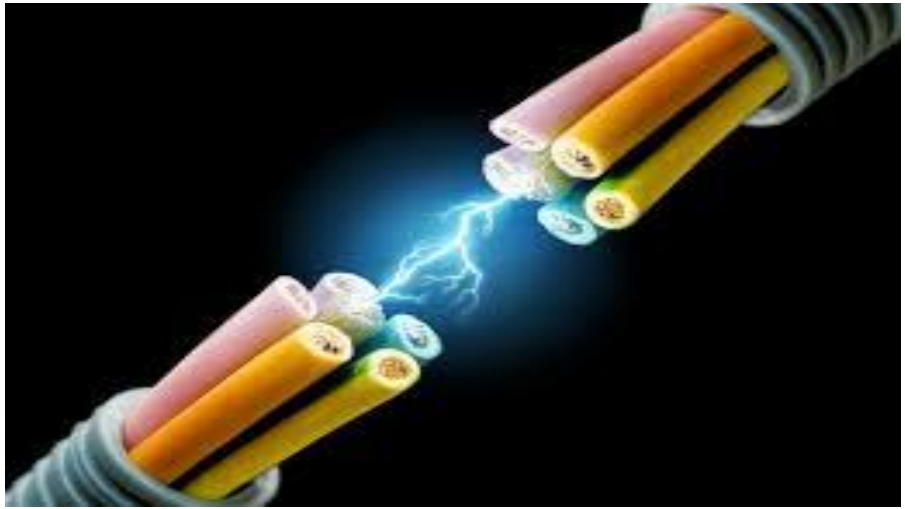
1.Enumeration Technique or Brute Force technique
2. Priority List Method
3. Dynamic Programming
4. Lagrange Relaxation
5. Integer and Mixed integer programming
6. Benders decomposition
7. Branch and Bound

NON – CLASSICAL APPROACHES

Other non – classical approaches are

1. Genetic Algorithms
2. Greedy random adaptive search procedure
3. Particle swarm optimization
4. Simulated annealing

RECAP….



…THANK YOU