



Non conventional network calculations in the power system

Dr. Péter Kádár, senior member of IEEE

Óbuda University
Dept. of Power Systems, Alternative Energy Techniques Knowledge Centre
Bécsi u. 94. Budapest H-1034 HUNGARY
Phone: +36 209 447 241; e-mail: kadar.peter@kvk.uni-obuda.hu

The development, operational control and evaluation of the events in the power system necessitate different network calculation methods. For load distribution and contingency analysis is used a stationary grid model. The classic load-flow algorithm is an iterative solution for equation system of thousands variables. For the efficient computation of networks containing huge number of nodes and branches some acceleration and simplification algorithms are used too (decoupled and DC load-flow).

The emerging structures as the large non meshed radial networks, microgrids, power quality islands opens new frontiers instead of the exhaustive number-crunching techniques. The task can be rephrased and the application of many intelligent computation method can be relevant, as the artificial neural networks and several optimization solutions. The presentation introduces the on- and off-line tasks of the network calculations, the existing methods and the novel techniques as metaheuristics.

Through examples we are getting acquainted with the

- Applications of Simulated Annealing, Tabu Search and Genetic Algorithms for Transmission Network Expansion Planning
- Heuristic Ant Colony Search algorithm in Constrained Load Flow problem (reactive power balance)
- Optimization for bottle neck flow
- Cost and/or loss minimization
- Algorithms for power flow control by Flexible AC Transmission devices
- Trading path optimization, etc.

Finally an outlook is given about the new trends of the calculation demands and solutions.