Non Conventional Network Analysis

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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.

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)
- Optimal power dispatch based on linear decomposition
- Optimization for bottle neck flow
- Cost and/or loss minimization
- Algorithms for power flow control by Flexible AC Transmission devices
- Trading path optimization

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

CURRICULUM VITAE

Peter Kadar was born in 1963, Budapest, Hungary. He received Power Engineering diploma at Technical University of Budapest 1987; PhD 1994; MBA at Open University, UK, 2002. He works in the area of the Power System control and renewable energies.

First he worked for industry (Power Station and Network Engineering Company), then in research (Research Institute for Measurement and Computing Techniques Department of Industrial Application) and later at a software development company (DYNAdata Ltd.). Between 2002 and 2005 he is the editor in chief of magazine “Electrotechnics”.

He is a lecturer of Technical University of Budapest from 1994, and now an associate professor at Óbuda University, Budapest, Hungary and gives lectures about energetics, energy management, renewable systems and informatics in the energy sector, simulation and planning, energetics; power system control, renewable energy sources. He teaches in BSC, MSC and PhD courses. He has more than 170 publications.

He is the director of the Power System Department, Faculty of Electrical Engineering at Óbuda University. He is invited lecturer of Patra Summer University 2007-2014, in Patra, Greece. He is also member of Hungarian Electrotechnical Association since 1985, 1990, Chair of Scientific and Professional Committee from 2013. Member of CIGRÉ, member of organising committees of conferences. Senior member IEEE, Treasurer of IEEE Hungary Section (HS) 2003-2004, Secretary of HS 2005-2008, Vice Chair of HS 2009-2012, Chair of HS from 2013-2016.