

Planning of multi-type FACTS devices in restructured power systems with wind generation and Voltage dependent loads to develop long-term profit and power quality indices

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Abstract: In this thesis, planning of multi-type FACTS devices in restructured power systems has been taken into consideration. The main goal is to maximize long-term profit and develop power quality indices in presence of wind generation and Voltage dependent loads considering their commercial, residential and industrial mode and multilateral power contracts. Two different 14 and 30 bus test systems have been used to determine the optimal location and size of SVC, TCSC and UPFC. Optimization goals are long term profit maximization and PLi and QLi power quality development. In this regard, MOPSO algorithm has been used considering different factors like load and wind power variations, generator capacity constraints, line constraints, voltage regulation, dispatchable load constraints, re-dispatch costs, cost of load shedding and multilateral contracts. Simulation has been analyzed for a 10 year horizon and results show the acceptable performance of the method in finding optimal location and size of FACTS which leads a reduction in cost of load shedding, voltage profile development and balanced flow in normal and contingency modes of operation.

Keywords : Key Words: FACTS planning, Power Quality Indices, Power Market, MOPSO algorithm

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