Optimal economie dispatch for the Nigerian grid system considering voltage and line flow constraints

Abstract:

The electric power industries worldwide have undergone considerable changes especially from vertical structure to full deregulated entities. These changes are now introducing new problems in terms of operations, controls and planning of the entire grid systems. This calls for a more reliable analytical tool ever than before. One feasible solution is to perform the Optimal Economic Dispatch (OED) paradigm on this restructured power system so as to provide fairness to all operators. In this paper, the economic dispatch problem with voltage and line flow constraints has been formulated for the hydro-thermal generating units feeding the Nigerian power system. In order to solve the arising power flow problem a MATLAB based simulation package, MATPOWER version 3.0 has been suitably modified to obtain feasible solutions for different loading system scenarios. The results obtained showed that the OED offered a better optimal power schedules, power loss minimization and reduced total fuel cost than earlier work based on Micro-Genetic Algorithm, (MGA) and Conventional Genetic Algorithm (CGA).