ABSTRACT

The analysis of maintenance schedules in transmission systems is among the responsibilities of power systems engineers, which have to take operational decisions regarding their execution. In large power systems many analyses are necessary to evaluate the impact of the proposed schedule. These analyses are performed for many different operating conditions, which depends on the outages schedule. Based on such analyses and on previous experience with the system, power engineers will accept, reject or reschedule some proposed outages. Modern power systems are operating near their capacity limits and the decision about accepting or not the outage schedule become critical. It is essential to perform reliable analyses, as inadequate decisions may cause severe damages for system operation. Nowadays, besides the complexity of operating interconnected power systems, there is lack of integrated computational tools for performing the necessary analyses, which would allow taking the best decisions. For a given outage schedule considering different operating conditions that the system may experiment, the number of scenarios that should be analyzed may be extremely large. Then an exhaustive analysis of all possible situations is not feasible for a large power system.

This work presents a methodology for an integrated analysis of outages schedule in transmission systems, which aims to obtain a schedule that will be as close as possible to the original one, observing operational constraints and taking into account outages priorities. The problem is formulated as a constrained optimization problem and, due to its combinatorial nature; the genetic algorithm technique is employed to obtain the optimal solution. Simulations with the IEEE 14 bus test system and part of the Brazilian system are presented to illustrate the proposed methodology and the obtained results.