On the Application of heuristic Method and Saddle Node Bifurcation for Optimal Placement of FACTS Devices in Power System

ABSTRACT

This study focuses on an optimal placement of five major types of FACTS devices, namely, Static Var Compensator (SVC), Thyristor Controlled Series Compensator (TCSC), Static Synchronous Compensator (STATCOM), Static Synchronous Series Compensator (SSSC) and Unified Power Flow Controller (UPFC) in power system network using a well-known and applicable heuristic method known as genetic algorithm to seek the optimum location and setting of these controllers in the system. The locations of controllers are determined based on Saddle- Node Bifurcation theory on voltage collapse. In this paper, all the possible control parameters of each device including its location are optimized simultaneously to increase the distance to collapse point of the system. The IEEE 118-bus test system is utilized to verify the recommended method. The achieved results clearly proved that the proposed method is an effective approach for the placement of FACTS in power system.