

Abstract

Past literature has attempted to solve the problem of network reconfiguration with Distributed Generators (DGs) without taking into consideration the intermittent renewable at a close proximity. Distribution Network Reconfiguration (ADNR) must account uncertain behavior of loads and wind when the commercial wind based DG, Doubly Fed Induction Generators (DFIG) supports a significant part of network. In this paper, a new Hybrid Bacterial Foraging and Differential Evolution (HBFDE) algorithm is considered for the ADNR problem with minimum loss and an improved voltage profile. In the HBFDE algorithm the Differential Evolution (DE) algorithm is combined with the Bacterial Foraging (BF) algorithm to overcome slow and premature convergence of BF. Indeed, the proposed algorithm is based on the evolutionary natures of BF and DE, to take their advantage of the compensatory property, and avoid their corresponding drawbacks. In addition, to cope with the uncertainty behavior of loads and wind, a stochastic model is presented to solve the ADNR problem when the uncertainty related to wind and load forecast is modeled in a stochastic framework on scenario approach basis. The proposed algorithm is tested on the IEEE 33-Bus Radial Distribution Test Systems. The results of the simulation show the effectiveness of proposed algorithm real time and real world optimization problems facing the smart grid.