

A hybrid genetic-firefly algorithm for siting and sizing of distributed generation

Abstract

Distributed generation has been becoming more well-known in the power sector due to its ability in power loss reduction, low investment cost, increase reliability, and most significantly, to exploit renewable-energy resources. The optimal siting and sizing of distributed generation are necessary for maximizing the distributed generation potential benefits in a power system. In this paper, a novel hybrid population-based algorithm is proposed with the combination of Genetic Algorithm, and Firefly Algorithm is presented for optimal siting and sizing of distributed generation on a radial distribution system. The objectives are to minimize the total real power losses in the system and improve voltage profile within the voltage constrains. Both the optimal size and location are obtained as outputs from the Hybrid Genetic-Firefly Algorithm toolbox. An analysis is carried out on 33 bus systems, and 69 bus systems then compare to the Standard Genetic Algorithm and Standard Firefly Algorithm to verify the effectiveness of the proposed methodology. The proposed algorithm outperforms Standard Genetic Algorithm and Standard Firefly Algorithm in terms of power losses reduction, improving voltage profile, and also in convergence rate.