

RELIABILITY OPTIMIZATION OF A RADIAL DISTRIBUTION SYSTEM USING FDR PSO ALGORITHM BASED ON CUSTOMER AND ENERGY BASED INDICES

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Abstract

In this paper, a methodology has been developed for reliability evaluation of radial distribution system by determining the optimal values of repair times and failure rates of each section. Failure rate and repair time based penalty cost function has been constructed. Constraints on customer and energy based indices i.e. SAIFI, SAIDI, CAIDI, AENS, and ASAI are considered. A decomposed approach, which optimizes failure rate and repair time separately satisfying the constraints, is used. A recently developed PSO variant called Fitness-Distance-Ratio based Particle Swarm Optimization (FDR PSO) algorithm is employed to solve the optimization problem. The proposed algorithm has been implemented on an eight node distribution network. The obtained results are compared with PSO, CAPSO, and DE algorithms.

Keywords: Failure rate, Repair time, Reliability indices, Fitness Distance Ratio, FDR PSO.