

## Radial Distribution Network Reliability Improvement by Using Imperialist Competitive Algorithm

**Authors :** Azim Khodadadi, Sahar Sadaat Vakili, Ebrahim Babaei

**Abstract :** This study presents a numerical method to optimize the failure rate and repair time of a typical radial distribution system. Failure rate and repair time are effective parameters in customer and energy based indices of reliability. Decrease of these parameters improves reliability indices. Thus, system stability will be boost. The penalty functions indirectly reflect the cost of investment which spent to improve these indices. Constraints on customer and energy based indices, i.e. SAIFI, SAIDI, CAIDI and AENS have been considered by using a new method which reduces optimization algorithm controlling parameters. Imperialist Competitive Algorithm (ICA) used as main optimization technique and particle swarm optimization (PSO), simulated annealing (SA) and differential evolution (DE) has been applied for further investigation. These algorithms have been implemented on a test system by MATLAB. Obtained results have been compared with each other. The optimized values of repair time and failure rate are much lower than current values which this achievement reduced investment cost and also ICA gives better answer than the other used algorithms.

**Keywords :** imperialist competitive algorithm, failure rate, repair time, radial distribution network

**Conference Title :** ICPSE 2015 : International Conference on Power Systems Engineering

**Conference Location :** Boston, United States

**Conference Dates :** April 20-21, 2015