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Optimal Placement of DG in Radial Distribution using Optimization: A Review

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Abstract: *The restructuring of the electricity market and the shift towards power generation technologies aimed at reducing global greenhouse gas emissions have led to a rise in the use of distributed generation (DG). Recent developments in electric power, along with the challenges of building and maintaining large power plants, have generated significant interest in DG. DG presents a viable solution to issues like load growth, line overloading, supply quality, equipment maintenance intervals, and reducing line losses. Unlike centralized power plants, DG involves setting up power systems as close to consumers as possible. However, implementing DG in radial systems comes with challenges such as active and reactive power loss, voltage profile, sizing, and placement of DG units, and reliability. To address these challenges, researchers have used various biological and evolutionary algorithms, including analytical methods, numerical approaches, metaheuristic approaches, and hybrid approaches. These algorithms take into account design variables (such as location, size, and type of DG units) and load variables (constant or variable power) to meet specific requirements. They have been tested on different bus systems. This paper reviews the techniques proposed for the optimal placement of DG in radial distribution systems, highlighting their effectiveness.*

Keywords: Particle Swarm Optimizer (PSO),Radial Distribution System (RDS), Optimal Power Flow (OPS), Distribution Network (DN), Distributed Generator (DG)