Abstract:

In electrical power systems, efficient power transfer between the high-voltage transmission lines to low-voltage distribution lines is crucial. Nevertheless, the distribution system often suffers significant I^2R losses due to high R/X ratios, high current levels, and low voltage. Distribution businesses (DISCOM) are motivated to reduce losses in their networks in order to reap financial rewards. The financial penalties or gains for DISCOM are based on the discrepancy between actual losses and standard losses. As a result, experts have investigated minimizing losses in distribution networks in great detail. Many strategies have been investigated and put into practice in the past to deal with the loss reduction issue. These approaches vary in methodologies, problem formulations, methods used, and solutions produced. The strategies utilized for loss reduction include feeder grading, distributed generation (DG) allocation, network reconfiguration, capacitor allocation, and high voltage distribution system approaches. The primary goal of this work is to employ GA and PSO to identify the best distribution of Photovoltaic (PV) generation based on a multi-objective function with various constraints. MATLAB R2021a assessed the algorithms' efficacy in the IEEE-33 and IEEE-69 bus systems.

Kewwords: DISCOM, DG, R/X ratio, RDN, BIBC, BCBV, DLF, I2R loss, TVD, Photovoltaic generation.