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Integrated clustering development using embedded meta evolutionary-firefly algorithm technique for DG planning

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Recent trend changes have created opportunities to achieve numerous technological innovations including the use of distributed generation (DG) to achieve different advantages. A precise evaluation of energy losses is expanding rapidly when DG is connected to the electricity sector due to developments such as increased competition and real time pricing. Nevertheless, non-optimal DG installation either in the form of DG locations and sizing will lead to possible under-compensation or over-compensation phenomena. The integrated clustering resulted from the pre-developed Embedded Meta Evolutionary Programming-Firefly Algorithm (EMEFA) has been used to ensure the optimum allocation and placement of DG. The study also considers the different types of DG. The aim of the technique is to consider the computational time of the optimization process for DG planning in achieving the minimal total loss. Two test systems have been used as test specimens to achieve the efficacy of the proposed technique. In this study, the techniques proposed were used to establish the DG size and the appropriate place for DG planning. The results for total losses and minimum voltage for the system were recorded from the simulation. The result in this study will be compared with the ranking identification technique to ensure the capability of this technique. The power system planner can adopt the suitable sizes and locations from the obtained result for the planning of utility in term of economic and geographical consideration.

Keywords
DG planning; Distributed generation; Evolutionary programming; Firefly algorithm; Loss minimization