Abstract

This paper presents the Water Wave Optimization Algorithm (WWOA) for solving multi-area economic dispatch (MAED) problem with tie line constraints considering transmission losses, area demand constraints, multiple fuels options, valve-point loading effects and prohibited operating zones. Here, the amount of power that can be economically generated in one or more areas are exchanged with other areas with deficient generation through the interconnected tie-lines while meeting out the area wise and total power demand and other constraints is formulated as the MAED problem. WWOA is one of the nature inspired algorithm which mimics the phenomena of water waves for global optimization is implemented for the solution of multi-area economic dispatch problem. The effectiveness of the proposed algorithm has been verified on three different test systems and are compared with Teaching learning based optimization (TLBO), differential evolution (DE), evolutionary programming (EP) and real coded genetic algorithm (RCGA), considering the quality of the solution obtained, and the results shows a quick convergence of the proposed algorithm and are found to be superior than the other methods in the literature and seems to be a potential alternative advancement in practical
power system for solving the MAED problems.

References

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Index Terms

Computer Science  Power Systems

Keywords

Water wave optimization algorithm, multi-area economic dispatch, multiple fuel options, cost
minimization, prohibited operating zones.