# Robust Multi-Area Economic Dispatch Using Coulomb's and Franklin's Laws Based Optimizer

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## Abstract

The multi-area economic load dispatch (MAELD) can reduce running costs through making the areas with more cost-effective units produce more energy. The excess power is transferred to the areas with expensive units. This paper contributes a new physics inspired metaheuristic approach called the Coulomb's and Franklin's laws based optimizer (CFLBO) to solve the MAELD problem. The CFLBO approach is developed from Coulomb's and Franklin's theories, which comprise attraction/repulsion, probabilistic ionization, and contact stages. The effectiveness of the envisaged CFLBO approach has been examined on three standard test systems with various areas. Results obtained by the CFLBO approach are compared with the exchange market algorithm (EMA) and the existing state-of-the-art approaches to deal with MAELD. Numerical outcomes show the benefits of the quick convergence and better quality of the suggested approach compared to existing strategies. Consequently, the proposed approach is a helpful tool for generation planning in MAELD problems.

**Keywords:** CFLBO, metaheuristic approach, multi-area economic load dispatch, multi-fuel alternatives

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