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[Home](#) > [Volume 10, Issue 4, December 2009](#) > [Balamurugan](#)

## Emission-constrained Dynamic Economic Dispatch using Opposition-based Self-adaptive Differential Evolution Algorithm

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### Abstract

*This paper presents an opposition-based self-adaptive differential evolution algorithm for emission-constrained dynamic economic dispatch (ECDED) problem with non-smooth fuel cost and emission level functions. ECDED is an optimization problem with an objective to determine optimal combination of power outputs for all committed generating units over a certain period of time in order to minimize the total fuel cost and emission while satisfying dynamic operational constraints and load demand in each interval. A multi-objective function is formulated by assigning the relative weight to each of the objective and then optimized by opposition-based self-adaptive differential evolution algorithm. The convergence rate of differential evolution is improved by employing opposition-based learning scheme and a self-adaptive procedure for control parameter settings. The validity and effectiveness of the proposed approach is demonstrated by a test system with five thermal generating units. The simulation results show that the proposed approach provides a higher quality solution with better performance.*

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