

Paper

Economic load dispatch with nonsmooth cost functions using evolutionary particle swarm optimization

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Article first published online: 23 SEP 2013

DOI: 10.1002/tee.21915

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Issue



IEEJ Transactions on Electrical and Electronic Engineering

[Early View \(Online Version of Record published before inclusion in an issue\) \(/journal/10.1002/\(ISSN\)1931-4981/earlyview\)](http://journal/10.1002/(ISSN)1931-4981/earlyview)

Additional Information

How to Cite

Abdullah, M. N., Abu Bakar, A. H., Rahim, N. A. and Moklis, H. (2013), Economic load dispatch with nonsmooth cost functions using evolutionary particle swarm optimization. IEEJ Trans Elec Electron Eng. doi: 10.1002/tee.21915

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Publication History

1. Article first published online: 23 SEP 2013
2. Manuscript Revised: 14 MAR 2013
3. Manuscript Received: 27 JUL 2012

- Abstract
- [Article \(/doi/10.1002/tee.21915/full\)](https://doi.org/10.1002/tee.21915/full)
- [References \(/doi/10.1002/tee.21915/references\)](https://doi.org/10.1002/tee.21915/references)
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Keywords:

economic load dispatch; evolutionary programming; particle swarm optimization; prohibited operating zone; ramp-rate limits

Abstract

This paper presents an evolutionary particle swarm optimization (EPSO) method for solving the nonconvex economic load dispatch (ELD) problem. In practice, the nonconvex and the discontinuous cost function should be considered when optimizing ELD problem with constraints such as valve point effects, prohibited operating zones, ramp-rate limits, and transmission loss of the system. In view of these constraints, the ELD problem is difficult to solve by any mathematical method. In EPSO, the evolutionary programming concept (combination, tournament competition, sorting, and selection) is employed in the classical PSO method in order to find the best individual and best group position based on the survival particle. The effectiveness of the EPSO is tested on 3-, 6-, 15-, and 38-unit systems. The results obtained by EPSO are also compared with classical PSO and other results reported in the literature. It is concluded that the EPSO method can produce lower generation cost compared to the existing methods. © 2013 Institute of Electrical Engineers of Japan. Published by John Wiley & Sons, Inc.

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