

Title: A Comparative Study of Economic Load Dispatch Problem using Computer Simulation Tool, Conventional and Evolutionary Algorithms(Conference Paper)

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Abstract

Enhancing power generation to meet demand while simultaneously mitigating the operational expenses of power plants is a pivotal endeavor. The optimization of economic load dispatch (ELD) presents itself as a requisite process to curtail operational costs, including fuel expenses and incremental costs. In the context of this study, a comprehensive examination is conducted utilizing the Power World Simulator alongside the Lambda Iteration (LI) Method, the Particle Swarm Optimization (PSO) Method, and the Teaching Learning-Based Method, employing a standard IEEE 9 bus system as a benchmark. The execution of LI, PSO, and TLBO methodologies is facilitated through the MATLAB programming language. Comparative analysis reveals TLBO's superior efficacy in optimizing fuel costs, incremental costs, and power losses, outperforming both Power World Simulator and PSO, as well as the lambda iteration method. Noteworthy findings indicate a reduction in total fuel costs, incremental costs, and power losses with an increase in the number of generators, while the introduction of unconnected branch lines to the transformer escalates costs and losses. Furthermore, heightened load demand correlates with increased costs and losses within the system. Additionally, TLBO exhibits a smoother convergence curve in contrast to PSO, further accentuating its optimization capabilities. © 2024 IEEE.

Author keywords

Economic Load Dispatch (ELD) Fuel Cost (FC) Incremental Cost (IC) Lambda Iteration (LI) Particle Swarm Optimization (PSO) Power Loss (PL) PowerWorld Simulator (PWS) Teaching Learning Based Optimization (TLBO)

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