

IMPLEMENTING MODIFIED PARTICLE SWARM OPTIMIZATION METHOD  
TO SOLVE ECONOMIC LOAD DISPATCH PROBLEM

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To my beloved mother and father

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## ABSTRACT

Economic Load Dispatch (ELD) is one of the important optimization tasks which provide an economic condition for power systems. In this work, Modified Particle Swarm Optimization (PSO) as an efficient and reliable evolutionary based approach has been proposed to solve the constraint economic load dispatch problem. The proposed method is able to determine, output power generation for all of the power generation units, so that the total, constraint cost function is minimized. In project report, a piecewise quadratic function is used to represent the fuel cost of each generation units, and the B-coefficient method is used to model transmission losses. The feasibility of the proposed Modified PSO is demonstrated for 4 power system test cases, consisting 3,6,15, and 40 generation units. The obtained Modified PSO results are compared with Standard PSO (SPSO), Genetic Algorithm (GA) and Quadratic Programming (QP) base approaches. These results reveal that the proposed method is capable to get higher quality solution including mathematical simplicity, fast convergence, and robustness to solve hard economic load dispatch problem.

## ABSTRAK

Penghantaran Beban Ekonomik (Economic Load Dispatch (ELD)) adalah salah satu tugas pengoptimuman penting yang menyediakan persekitaran ekonomik bagi system kuasa. Didalam tugas ini, *Modified Particle Swarm Optimization (PSO)* telah diusulkan untuk menyelesaikan masalah penghantaran beban ekonomik terhad secara evolusi efisien dan tepat. kaedah yang diusulkan dapat menentukan penghasilan kuasa output untuk semua unit penghasilan kuasa supaya jumlah fungsi kos terhad adalah minimal. didalam laporan projek, sebuah fungsi kuadratik cebisan digunakan untuk mewakili kos minyak bagi setiap unit penghasilan kuasa dan kaedah B-Coefficient digunakan to memodelkan lesapan transmisi. kebolehan kaedah PSO terubah yang dicadangkan telah didemonstrasikan untuk empat kes ujian sistem kuasa yang mengandungi 3,6,15, dan 40 unit penghasilan kuasa. keputusan PSO terubah yang diporolehi adalah dibandingkan dengan PSO biasa (SPSO), Algoritma Genetik (GA) dan Program Kuadratik (QP) asas. Keputusan yang diporolehi menunjukkan kaedah yang dicadangkan berupaya untuk mendapatkan kualiti penyelesaian yang lebih tinggi serta kaedah metematik yang mudah, penumpuan yang lebih cepat dan tegar untuk menyelesaikan masalah penghantaran beban ekonomik yang susah.