

ECONOMIC DISPATCH USING HYBRID OF DIFFERENTIAL EVOLUTION AND WATER CYCLE ALGORITHM

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CERTIFICATE

We accept the work contained in this report as a confirmation to the required standard for the partial fulfilment of the degree of MS Electrical Engineering(Power).

Head of Department

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DEDICATION

My effort is dedicated to my parents, family and respected teachers, especially to my family.

DECLARATION

I affirm that entire material is my personal work besides it is outcome of struggle done throughout the duration of registration. It does not have any content printed earlier or inscribed via someone else besides this it neither have content to which an extensive degree was recognised intended for the grant of any additional gradation or certificate of the university or other institute of higher learning, acknowledgement has been made in the text otherwise.

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ABSTRACT

Economic dispatch (ED) is a very demanding part of power system operational and control detailed by means of procedure of evaluating electrical power production of thermal machines for lowest total power cost in a manner that both equality (i.e. Power demand) and inequality (i.e. Generating machine limits) constraints are satisfied.

In system optimization, there are two minima in search space a native minima and global minima. Complication is to find global minima instead of local minima. ED is a trying OP that needs proficient computational techniques. Many classical methods, such as mixed integer programming, newton technique, DP, gradient search method, Lagrange method, nonlinear programming with network flow, and Lagrange relaxation. [1-4] these traditional methods have drawback of finding a local minimum instead of global minima. We have many techniques called evolutionary procedures to solve such types of complications with global minima e.g. Cooku Search Algorithm, Fuzzy evolutionary programming (fuzzy EP), Simulated annealing based goal-attainment (SAGA), Quantum particle swarm optimization (QPSO), differential evolution(DE) & Water Cycle Algorithm(WCA) etc.

In this report a hybrid of differential evolution(DE) and water cycle algorithm (WCA) is implemented on ED. DE is a heuristic approach for minimalizing non-differentiable on non-linear unremitting space functions and WCA is a meta-heuristic population constructed algorithm which has been recently introduced for cracking restrained Optimization Problems OPs. Hybrid of DE and WCA is tested on non-convex test systems in this project.

The feasibility is demonstrated for three different standard systems (3 machine, 6 machine and 10 machine system) published on IEEE, and matched with further optimization mechanisms concerning the result quality. Results demonstrate that prescribed scheme is competent for ED problems to uncover healthier results efficiently.

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ABBREVIATIONS

ANN	Artificial Neural Network
BTU	British Thermal Unit
CS	Cuckoo Search
COP	Combinatorial Optimization Problems
CP	Constrained Problems
COP	Constrained optimization problem
DE	Differential Evolution
DED	Dynamic Economic Load Dispatch
ER-WCA	Evaporation Rate Based WCA
EDPOZ	ED with prohibited operating zones.
EDVP	ED in view of valve-point effects
EDMF	ED with several fuel units
ELD	Economic Load Dispatch
ED	Economic Dispatch
FOP	Function Optimization Problems
fuzzy EP	Fuzzy Evolutionary Programming
GA	Genetic Algorithm
G-type	Generation Type
OP	Optimization Problem
PSOC	Power system operation and control
QN	Quasi-Newton Method
QPSO	Quantum Particle Swarm Optimization

SAGA	Simulated annealing based goal-attainment
VPE	Valve point effects
VSHDE	Variable scaling hybrid differential evolution
WCA	Water Cycle Algorithm