

**Bio-inspired Computational Heuristics Integrated with Active-set
Method to Study Economics Load Dispatch Problems involving
Stochastic Wind Power**

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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 (EE).

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Dedicated to
My Respectable Parents
Husband and
Sweet Siblings

Declaration

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ABSTRACT

In this research work, Bio-inspired Computational Heuristic Algorithms (BCHAs) integrated with Active-Set Method (ASM) are designed to Study Economics Load Dispatch (ELD) Problems with valve point effects involving stochastic wind power. These BCHAs are developed through variants of genetic algorithms based on different set of functions for its fundamental operators in order to make exploration and exploitation in the entire search space for finding the global optima, while the ASM algorithms is used for rapid refinement of the results. The designed schemes are intended to test on different ELD systems consist of combination of thermal generating units and wind power plants with and without valve point effects. The accuracy, convergence, robustness and complexity of the proposed schemes will be examined through comparative studies based on sufficient large number of independent runs and their statistical analyses. Beside the novel application of BCHAs hybrid with ASM to integrated power plants systems based on wind and thermal generating units other advantages of the schemes are simplicity of the concept, ease in implementation and wider domain of applicability.

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ABBREVIATIONS

ELD	Economic Load Dispatch
ELD-VPLE	Economic Load Dispatch with valve point loading effect
ELD-VPLE-SW	Economic Load Dispatch with valve point loading effect involving stochastic wind power
NVPLE	No Valve point loading effect
GA-ASA	Genetic algorithm with Active Set Algorithm
SQP	Sequential quadratic programming
NAG	Numerical algorithm group
PSO	Particle swarm optimization
LRS	Local random search
GAs	Genetic Algorithm
MOBCC	Multi-objective bacterial colony chemotaxis
HNN	Hopfield Neutral Network
HINN	Improved Hopfield Neutral Network
RCGA	Real Coded Genetic Algorithm
HM	Hierarchical Method
MAED	Multi Area Economic Dispatch
ABC	Artificial Bee Colony
DE	Differential evolution
EP	Evolutionary programming

EEDP-SW	Economic emission dispatch problems through stochastic wind
SMODE	Single and multi-objectives differential evolution
REED	Robust economic/emission dispatch
GABC	Gbest artificial bee colony
OPF	Optimal power flow
MAED	Multi Area Economic Dispatch
BLP	Bi-level programming
MPOCD	Multi-period optimal cost dispatch
MO	Multi-objective
TVFSM	Time fluctuating fuzzy selection scheme
WTEED	Wind thermal economic emission dispatch
WPNN	Weighted probabilistic neural network
BBO	Biogeography based optimization
WPNN-BBO	Weighted probabilistic neural network involving biogeography based optimization
BBO-SQP	Biogeography based optimization involving sequential quadratic programming
DEED	Dynamic economic emission dispatch
DSM	Demand side management
DP	Dynamics programming.
HIC-SQP	Hybrid imperialist competitive-sequential quadratic programming
HSA	Harmony search algorithm