HYDROTHERMAL SCHEDULING USING HYBRID ALGORITHM

By

Muneeb Yaqoob

Bahria University Islamabad Campus – Pakistan

CERTIFICATE OF ORIGINALITY

I certify that the intellectual contents of the thesis

"Hydrothermal Scheduling using Hybrid Algorithm"

is the product of my own research work except, as cited properly and accurately in the acknowledgment and references, the material taken from any source such as research papers, research journals, books, internet, etc. solely to support, elaborate, compare and extend the earlier work, Further, this work has not been submitted previously for a degree at this or any other University.

The incorrectness if the above information, if proved at any stage, shall authorize the university to cancel my degree.

Signature: _____. Dated: _____.

Name of the Research student: _____.

HYDROTHERMAL SCHEDULING USING HYBRID ALGORITHM

A Thesis Presented to

Bahria University Islamabad

In partial fulfillment of the requirement for the degree of

MS (Electrical Engineering)

By

Muneeb Yaqoob

Registration Number 32378

Enrollment Number 01-244122-074

SPRING, 2015

Final Approval

This thesis titled

HYDROTHERMAL SCHEDULING USING HYBRID ALGORITHM

By

Muneeb Yaqoob

Registration Number 32378

Enrollment Number 01-244122-074

Has been approved

For the Bahria University, Islamabad

External Examiner: _____

Supervisor: _____

Engr. Sh. Saaqib Haroon
Assistant Professor, Dept. of Electrical Engg.
UET, Taxila

HoD: _____

Dr. Muhammad Najam-ul-Islam
Professor, Dept. of Electrical Engg.
Bahria University, Islamabad

Declaration

I, Muneeb Yaqoob Registration No. 32378, hereby declare that I have produced the work presented in this thesis, during the scheduled period of study. I also declare that I have not taken any material from any source except referred to wherever due that amount of plagiarism is within acceptable range. If a violation of HEC rules on research has occurred in this thesis, I shall be liable to punishable action under the plagiarism rules of the HEC.

Date: _____ Signature

_____

Muneeb Yaqoob

Registration No. 32378

Enrollment No. 01-244122-074

Certificate of Completion
of
Thesis Work

This is to certify that **Mr. Muneeb Yaqoob** Registration No. 32378 has successfully completed his research thesis, titled **HYDROTHERMAL SCHEDULING USING HYBRID ALGORITHM** under my supervision. The thesis meets the scholarly standard as set by Bahria University, Pakistan.

Date: _____ Supervisor

_____

Engr. Sh. Saaqib Haroon
Assistant Professor,
Dept. of Electrical Engg.
UET, Taxila.

Dedication

Dedicated to my mother, wife and children.

Muneeb Yaqoob
Registration Number 32378
Enrollment No. 01-244122-074

ACKNOWLEDGEMENTS

I would offer my utmost gratitude and praise to my Supervisor; Engr.Sh. Saaqib Haroon– Assistant Professor UET, Taxila for his attention, precious time and appropriate guidance; which helped me a lot for completion of this thesis.

In the end, I want to offer appreciation to my family for their patience, care, affection and help during the progress of this research.

Muneeb Yaqoob

Registration Number 32378

Enrollment No. 01-244122-074

Abstract

The basic purpose of hydrothermal scheduling is to reduce the cost of thermal plants. To achieve this goal one has to meet certain constraints of hydro and thermal plants. In this regard one has to satisfy different constraints of the hydraulic and thermal power systems. In Short term hydro thermal scheduling load demand follows a periodic variation for one day or a week therefore interval for this range small. For such a short interval the head may be taken constant. The amount of water required for the short range problem is determined by the long range problem [1].

If all the constraints are considered then the short term hydrothermal scheduling (STHS problems becomes complex and nonlinear. The problem has been resolved by numerous traditional and non-conventional procedures. Some of them include random integral programming (MIP) [2], dynamic programming (DP) [3], [4], gradient search method (GSM) [5], particle swarm optimization (PSO) [6], "Quasi-oppositional teaching learning based optimization" [7], "colonel real-coded quantum-inspired evolutionary algorithm" [8] and multi-objective differential evolution method for STHS [9].

In the proposed method following objectives are achieved. A new algorithm is introduced that can minimize the cost of objective function. The proposed algorithm follows the constraints given. Algorithm is capable of identifying the difference between local and global maxima. It is capable of successfully clearing the sensitivity analysis and does not has decreased diversity problem. It has good processing time as compare to the current algorithms.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

MIP	Mixed Integer Programming
GSM	Gradient Search Method
DP	Dynamic Programming
PSO	Particle Swarm Optimization
ED	Economic Dispatch
HTS	Hydro Thermal Scheduling
STHS	Short Term Hydro Thermal Scheduling
CSA	Cuckoo Search Algorithm
LR	Lagrange Relaxation
GA	Genetic Algorithm
SA	Stimulated annealing
DE	Differential Evolution
SPPSO	Small population based PSO
QOTLBO	Quasi-Oppositional Teaching Learning Based Optimization
ISAPSO	Improved Self Adaptive PSO
MDE	Modified DE
CB- MOHDE	Culture Belief Based Multi Objective Hybrid DE
EP	Evolutionary Programming
FEP	Fast EP
MATLAB	Matrix Laboratory
MCSA	Modified CSA