HYDROTHERMAL SCHEDULING USING GENETIC ALGORITHM APPROACH

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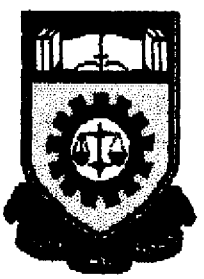

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ABSTRACT

This paper presents a hydrothermal coordination between hydro electric and thermal plant in a power system using Genetic Algorithm approach. The problem is to determine hydro and thermal generation scheduling for a day usually or hourly basis simultaneously satisfying hydraulic, thermal and electrical constraint while optimizing a criterion of performance.

The GA developed, aim to obtained the optimized output of the P_S (steam plant) and P_H (hydro plant) with minimum cost for the steam plant, since the generation cost for the hydro plant is absolutely free. The result achieved with the GA technique is compared with result from traditional non-linear optimization (λ-γ iteration with loss) technique.

Keyword: hydrothermal coordination, optimization and Genetic Algorithm.

NOMENCLATURE

P_H	hydro plant
P_S	steam plant.
λ	system incremental cost.
γ	incremental of hydroelectric water level (constant)
j	interval.
r_j	inflow during j.
V_j	volume at end of j
q_j	discharge during j
Q_j	fixed discharge for a particular hour.
V_s	starting volume
S_j	spillage discharge during j
GA	genetic algorithm
V_E	ending volume at j interval
q	hydro discharge from reservoir
n_j	length of j interval
L	Lagrange functions.
F	Total generation cost.

CHAPTER 1

INTRODUCTION

1.1 Introduction

There are many factors involved in the successful operation for a power system. The system is expected to have a power instantaneously and continuously available to meet customer's demands, whatever they may be. It is also expected that the voltage supplied to the customers will be maintained at or near the nominal rated value. The entire operating requirement must be achieved simultaneously, and it also expected that the production and distribution of power would be accomplished at minimum cost. The operation of hydro units in a system in which both hydro and thermal operation are used presents an extension of the economic loading problem. There are many conditions connected with hydro operation, such as uncontrolled flows and required releases of water for irrigation, flood control, salinity control. Procedures for integrating the operation of hydro and thermal generation on a system for minimum cost of generation have been developed and it is called hydrothermal coordination. or hydrothermal scheduling.

The optimal scheduling of generation in a hydrothermal coordination involves the allocation of generation among the hydro electric and thermal plant so as to minimize total generation cost for the thermal plant, while satisfying the various constraints on the hydraulic and power system network. There are three type of hydrothermal scheduling such as long term, medium term and short term. Short term scheduling is normally implemented in power system in order to control the generation of hydro and thermal plant with an objective to minimize the generation cost [1]. In short term scheduling, it is normally assumed that the target dam level at end of the scheduling period have been set by the medium