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OPTIMAL SOLUTION TO THE HYDRO-STEAM DISPATCH PROBLEM USING ARTIFICIAL NEURAL NETWORKS

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Abstract

Artificial Neural Networks will be applied to determine the optimal operation of a hydro-steam generating power system. Given the system load and the water supply as a function of time, the most economical generation for steam units and hydro-plants can be evaluated. The corresponding minimum costs of steam generation and the transmission losses can be also obtained. Once the designed neural network has been trained with input and output patterns, it will be valid for on- line operation to give best results with acceptable values of mean absolute error.

Keywords

Optimal operation, Hydro- thermal power systems, Scheduling of hydro-steam generation, maximum principle by Pontryagin, Artificial Neural Networks.

1. INTRODUCTION

The problem of determining the operating strategy for a hydro-steam electric power system for minimum operating cost has been previous discussed [1] - [4] , [17] and [18]. The optimization period may be in practice for gross systems of the magnitude of a year, while for systems with small water storage capacity it covers only one or a few days. Dynamic programming has a wide range of application in the area of long term and short term of the optimization problem [1] , [2] , [9] and [10]. Calculus of variations [10], [11] and gradient methods [12] - [14] have also been used. The maximum principle by Pontryagin [5] - [8] has several advantages in this area. The most important one is the great generating of the method with respect to permissible systems characteristics. It can also define the solution for the steam units and hydro-plants, which operate at limits or points of discontinuity. It