Turkish Journal

of

Electrical Engineering & Computer Sciences

Keywords
Authors

elektrik@tubitak.gov.tr

Scientific Journals Home Page

Turkish Journal of Electrical Engineering & Computer Sciences

A Pseudo Spot Price Algorithm Applied to the Pumped-Storage Hydraulic Unit Scheduling Problem

Salih FADIL
Department of Electrical Engineering,
Osmangazi University,
Batı Meşelik, 26480, Eskişehir-TURKEY
e-mail: sfadil@ogu.edu.tr
Celal YAŞAR
Department of Electrical Engineering,
Dumlupınar University,
43020, Kütahya-TURKEY

Abstract: A lossy electric power system that contains thermal units and a pumped-storage hydraulic unit is considered in this paper. The total cost of thermal units in an operation cycle is minimized under some possible electric and hydraulic constraints of the units. The operation cycle is divided into time intervals where the system loads are assumed to remain constant. The proposed solution technique has two main parts. In the first part, the active thermal generations and active generation or pumping power of the pumped-storage unit in all time intervals are determined by using units' active generation incremental costs and pseudo spot price of bought active powers. Calculation of active flows of transmission lines, which are used in the determination of the active generations and pumping power of the pumped-storage unit, are obtained by means of Newton-Raphson AC load flow calculation. In the second part, which we call the outer loop, the pseudo active generating/pumping incremental cost value of the pumped-storage hydraulic unit is determined according to its net water usage. The proposed dispatch technique considers the minimum and maximum reservoir storage limits of the pumped-storage unit, the upper and lower active generation limits of thermal units, and the upper and lower active pumping and generation power limits of the pumped-storage unit in a lossy power system. The proposed technique was demonstrated on an example power system and the obtained results are presented.

Turk. J. Elec. Eng. & Comp. Sci., **8**, (2000), 93-109.
Full text: pdf
Other articles published in the same issue: Turk. J. Elec. Eng. & Comp. Sci.,vol.8,iss.2.