

## عنوان مقاله:

Coordinated operation of Wind Farms, Cascaded Hydro, Photo-voltaic and Pump-storage Units by WT-ANN-ICA Prediction Method

## محل انتشار:

مجله الکترونیک صنعتی، کنترل و بهینه سازی، دوره 4، شماره 1 (سال: 1400)

تعداد صفحات اصل مقاله: 14

## نویسنده:

Ehsan Jafari - Department of Electrical Engineering of Islamic Azad University

## خلاصه مقاله:

a new algorithm is presented to reduce the uncertainty effects of wind farms power generation (WFPG) and photo-voltaic generation (PVG) in both day-ahead energy and ancillary services markets. Firstly, this research tries to predict the uncertainty of short-term WFPG with acceptable accuracy. Indeed, it uses the hybrid method of wavelet transform (WT) in order to reduce the fluctuations in the input historical data along with the improved artificial neural network (ANN) based on the nonlinear structure for better training and learning. In addition, regarding the high-level penetration of wind farms (WFs) on the power system, cascaded hydro units (CHUs) and pump-storage units (PSUs) are taken for the first time as supplementary units. Therefore, they are coordinated with WFs and photo-voltaic (PV) operations. Considering uncertainties of energy price, spinning and non-spinning reserves in the electricity market, WFPG, PVG and the availability of WFs, PV, CHUs and PSUs along with their effects on energy supply reliability lead to a scenario-based stochastic optimization problem. The aim of this problem is to increase the profit and decrease the financial risk (FR) of all of the units. The proposed method is implemented on WFs, PV, CHUs and PSUs of IEEE 118-bus standard system. Studying the results of profit and FR in the coordinated operation (CO) and the independent operation (IO) confirms that the profit is increased and the FR is reduced in the CO. Hence, the ability and merit of hybrid method of WT-ANN-ICA is verified.

## کلمات کلیدی:

Wind farms, Expected profit, Cascaded hydro, Photo-voltaic and Pump-storage units

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1480143>

