Energy Policy, vol.38, no.2, pp.715-725, February, 2010.

Electric power demand forecasting using interval time series: A comparison between VAR and iMLP

C. García de Ascanio; C. Maté Jiménez

Abstract-

Electric power demand forecasts play an essential role in the electric industry, as they provide the basis for making decisions in power system planning and operation. A great variety of mathematical methods have been used for demand forecasting. The development and improvement of appropriate mathematical tools will lead to more accurate demand forecasting techniques. In order to forecast the monthly electric power demand per hour in Spain for 2 years, this paper presents a comparison between a new forecasting approach considering vector autoregressive (VAR) forecasting models applied to interval time series (ITS) and the iMLP, the multi-layer perceptron model adapted to interval data. In the proposed comparison, for the VAR approach two models are fitted per every hour, one composed of the centre (mid-point) and radius (half-range), and another one of the lower and upper bounds according to the interval representation assumed by the ITS in the learning set. In the case of the iMLP, only the model composed of the centre and radius is fitted. The other interval representation composed of the lower and upper bounds is obtained from the linear combination of the two. This novel approach, obtaining two bivariate models each hour, makes possible to establish, for different periods in the day, which interval representation is more accurate. Furthermore, the comparison between two different techniques adapted to interval time series allows us to determine the efficiency of these models in forecasting electric power demand. It is important to note that the iMLP technique has been selected for the comparison, as it has shown its accuracy in forecasting daily electricity price intervals. This work shows the ITS forecasting methods as a potential tool that will lead to a reduction in risk when making power system planning and operational decisions.

Index Terms- Interval data; Interval multi-layer perceptron; Vector autoregressive model

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:
Request full paper to the authors

If you institution has a electronic subscription to Energy Policy, you can download the paper from the journal website:
Access to the Journal website

Citation:
García-Ascanio, C.; Maté, C. "Electric power demand forecasting using interval time series: A comparison between VAR and iMLP", Energy Policy, vol.38, no.2, pp.715-725, February, 2010.