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Functional prediction for the residual demand in electricity spot markets

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Abstract-

This paper deals with the prediction of residual demand curves in electricity spot markets, as a tool for optimizing bidding strategies in the short-term. Two functional models are formulated and empirically compared with the naïve method, which is the reference model in most of the practical applications found in industry. The first one is a functional nonparametric model that estimates the residual demand as a function of past residual demands, while the second one uses also electricity demand and wind power forecasts as explanatory variables. The proposed models have been tested using real data from the Spanish day-ahead market over a period of two years. The analysis of these results has motivated the development of a new forecasting strategy based on the selective combination of forecasts, taking advantage of the effect of wind fluctuations on the residual demand. This new forecasting approach outperforms the naïve method in all circumstances.

Index Terms- Bidding strategy, electricity market, functional data, residual demand curve, time series forecasting.

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