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Multiple seasonal cycles forecasting model: the Italian electricity demand. (English)

[Zbl 1416.62652](#)

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Summary: Forecasting energy load demand data based on high frequency time series has become of primary importance for energy suppliers in nowadays competitive electricity markets. In this work, we model the time series of Italian electricity consumption from 2004 to 2014 using an exponential smoothing approach. Data are observed hourly showing strong seasonal patterns at different frequencies as well as some calendar effects. We combine a parsimonious model representation of the intraday and intraweek cycles with an additional seasonal term that captures the monthly variability of the series. Irregular days, such as public holidays, are modelled separately by adding a specific exponential smoothing seasonal term. An additive ARMA error term is then introduced to lower the volatility of the estimated trend component and the residuals' autocorrelation. The forecasting exercise demonstrates that the proposed model performs remarkably well, in terms of lower root mean squared error and mean absolute percentage error criteria, in both short term and medium term forecasting horizons.

MSC:

[62P20](#) Applications of statistics to economics

[62M20](#) Inference from stochastic processes and prediction

[91B74](#) Economic models of real-world systems (e.g., electricity markets, etc.)

Keywords:

[electricity demand forecasting](#); [exponential smoothing](#); [multiple seasonality](#); [single source of error models](#)

Software:

[expsmooth](#)

Full Text: [DOI](#)

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