

Electricity demand forecasting with multiple seasonal patterns: An application to Spanish Data

J. Carlos García-Díaz*, O. Trull

Applied Statistics, Operations Research and Quality Department
Universitat Politècnica de València
Camino de Vera s/n, Building 7A, 46022 Valencia, Spain
* e-mail: juagardi@eio.upv.es

Abstract. Control and Scheduling of the electricity demand in power supply systems using time series forecasting is nowadays a powerful methodology used worldwide in all power distribution systems. The main reason of why it is so important is simple: The electricity cannot be saved in big quantities, therefore the production and the consumption must match precisely, in order not to waste energy and save costs. Time series forecasting is a very powerful tool for power supply systems, and it is used worldwide by most of the system regulators to predict precisely the electricity demand. These series show more than one seasonal pattern, for example, consider seasonal terms for 24 (day) and 168 (week) for hourly data, and in this case double seasonal exponential smoothing has become the best solution for making forecasts for such kind of time series. Despite of this importance, there isn't nowadays any software that deploys this seasonal model. The regulators are demanding better tools in forecasting that capture this multiple seasonal pattern, and the later works on double and triple seasonal exponential smoothing seems to be a feasible solution. This paper uses concentrates on a MATLAB implementation of Taylor's double seasonal exponential smoothing model, and explains its fundamentals and how it works. Later, this paper uses an hourly recorded time series of electricity demand in Spain to make conclusions about the advantages of using this newer model for predictions.

Keywords: time series analysis, electricity demand forecasting; double Holt-Winters exponential smoothing.