

Curve Regression via Dimension Reduction and Forecasting Daily Electricity Loads

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Motivated by the Electricite de France (EDF) practice of forecasting the daily demand for electricity consumption, we propose a curve time series framework which consisting of two key steps: (i) modelling seasonal patterns such as the impact of temperature semiparametrically, and (ii) modelling the dependence structure across consecutive daily loads via curve linear regression. For the latter, a new methodology is proposed which is based on linear regression with both response and regressor being curves. The key idea behind the proposed methodology is a dimension reduction based on a singular value decomposition in a Hilbert space, which reduces the curve regression problem to several ordinary (i.e. scalar) linear regression problems. We illustrate the method using the French electricity loads between 1996 and 2009, on which we also compare our method with other available models including the EDF operational model.