

Electricity Load Modeling: An Application to Italian Market

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Abstract : Forecasting electricity load plays a crucial role regards decision making and planning for economical purposes. Besides, in the light of the recent privatization and deregulation of the power industry, the forecasting of future electricity load turned out to be a very challenging problem. Empirical data about electricity load highlights a clear seasonal behavior (higher load during the winter season), which is partly due to climatic effects. We also emphasize the presence of load periodicity at a weekly basis (electricity load is usually lower on weekends or holidays) and at daily basis (electricity load is clearly influenced by the hour). Finally, a long-term trend may depend on the general economic situation (for example, industrial production affects electricity load). All these features must be captured by the model. The purpose of this paper is then to build an hourly electricity load model. The deterministic component of the model requires non-linear regression and Fourier series while we will investigate the stochastic component through econometrical tools. The calibration of the parameters' model will be performed by using data coming from the Italian market in a 6 year period (2007- 2012). Then, we will perform a Monte Carlo simulation in order to compare the simulated data respect to the real data (both in-sample and out-of-sample inspection). The reliability of the model will be deduced thanks to standard tests which highlight a good fitting of the simulated values.

Keywords : ARMA-GARCH process, electricity load, fitting tests, Fourier series, Monte Carlo simulation, non-linear regression

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