Metrics for Storage, an Application Model

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Background

In today's electrical power grid, energy storage devices can be utilized in 17 different applications. Some of these applications have control signals that are stochastic in nature and hence can be quantified by their statistical properties. An Auto-Regression (AR) model has been developed to extract these properties such that they can be analyzed, compared, and reproduced in laboratory testing signals.


Dynamic Frequency - PJM (03/19/2011)
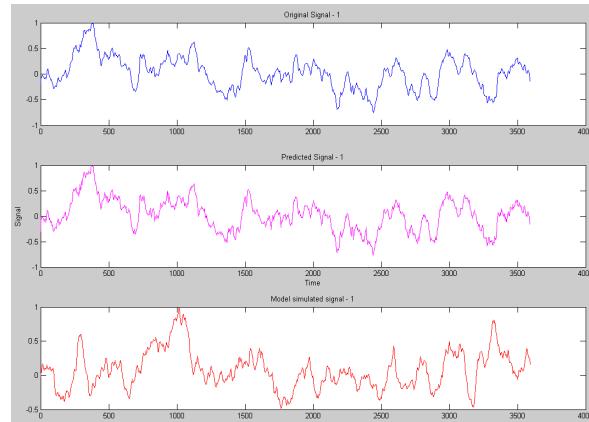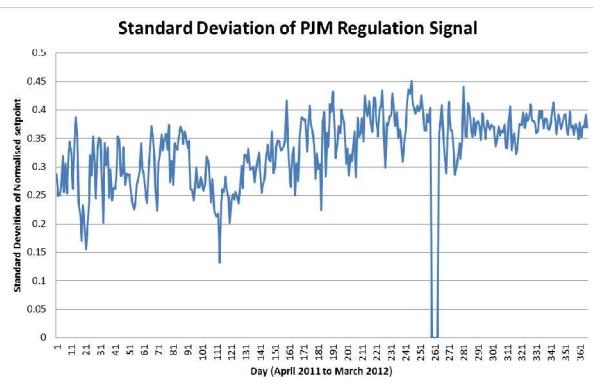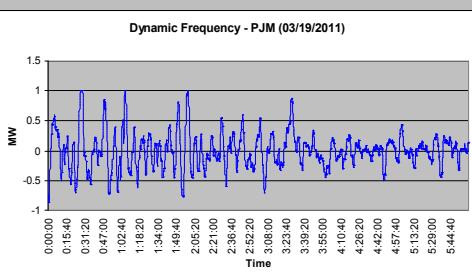
Figure 4 - Graph 1: Recorded Utility Signal, Graph 2: Auto Regression Model Signal, Graph 3: Random Signal w/ utility signal characteristics

Standard Deviation of PJM Regulation Signal

Project and Results

Work is underway to further validate the model using real data. Several statistical comparison techniques are being analyzed to determine if the signals being generated by the model accurately represent the regulation signal. In addition to validation preliminary analysis of the regulation data shows that the signal in non-stationary and so model validation should account for variations from winter to summer as well as night to day.

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