

# **Automatic specification of piecewise linear additive models: application to forecasting natural gas demand**

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**Abstract—** When facing any forecasting problem not only is accuracy on the predictions sought. Also, useful information about the underlying physics of the process and about the relevance of the forecasting variables is very much appreciated. In this paper, it is presented an automatic specification procedure for models that are based on additivity assumptions and piecewise linear regression. This procedure allows the analyst to gain insight about the problem by examining the automatically selected model, thus easily checking the validity of the forecast. Monte Carlo simulations have been run to ensure that the model selection procedure behaves correctly under weakly dependent data. Moreover, comparison over other well-known methodologies has been done to evaluate its accuracy performance, both in simulated data and in the context of short-term natural gas demand forecasting. Empirical results show that the accuracy of the proposed model is competitive against more complex methods such as neural networks.

**Index Terms—** Generalized additive models; Prediction; Natural gas demand; Short-term forecasting; Piecewise linear models; Nonlinear modeling

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