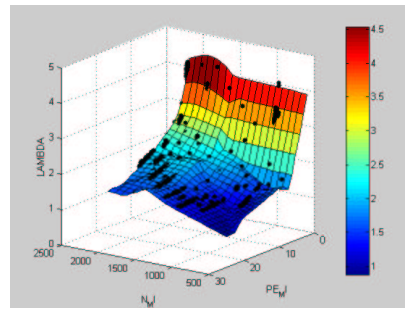


Engine Test Station



Typical (modelled) Motor Control Surface

Data plausibility Analysis during automatical Measurements at Engine Test Stations

Application of various Data Analysis Methods

During automatical measurements at engine test stations sometimes errors occur, which lead to false results. These results can be classified by an experienced operator without repeating the whole measurement. Now, the goal was to implement methods which reach a similar or even better error detection rate by keeping the overdetection rate as low as possible.

Requirements

The main goal of the project is in decision making, if actual data sets were correctly measured. The final decision is communicated to the operator over a traffic light. All measured data sets which are checked by various kinds of data analysis methods have a stationary and not a dynamical nature. Hence, the data sets in fact are ordered concerning time of measurement, but the intervals between two data points are not constant. Therefore time series analysis is not of much help. Additional goals like keeping the operating expense for parametrization as small as possible or the extensibility of the methods to arbitrary engine types were aspired.

Basic Approach

Instead of specification of errors and inspection of error patterns a deviation of an actual measured data point to a model generated on the basis of historical data or directly due to well-known physical dependencies is determined. Physical dependencies can be in terms of exact formulas or linguistic rules based on expert knowledge. In AMPA01 three classes of methods are used for generating models and its performance compared, namely:

- Statistical methods

- Methods to generate fuzzy inference systems
- Neural net methods

To achieve a better performance a combination of the outputs of these individual methods (Jobs) was performed by a discriminator. Of course, to be able to perform a valid discrimination, the outputs need to be standardized by a transformation function. The result of the discriminator is sent to the traffic light.

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