Improved fast model migration method for centrifugal compressor based on bayesian algorithm and Gaussian process model

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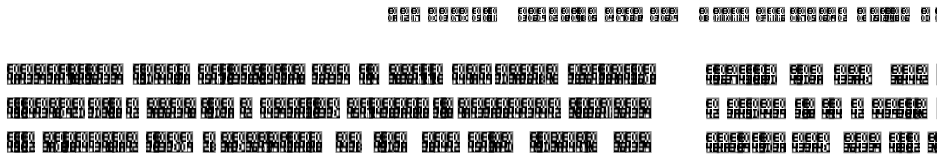
Abstract

Design and operation optimization of centrifugal compressor are always based on an accurate prediction model, however, due to the short time operation and lack of data information, it is difficult to get an accurate prediction model of a new centrifugal compressor in time. This paper applies an improved fast model migration method (FMM method) to develop the model of the new centrifugal compressor. The method adapts a Gaussian Process (GP) model from an old centrifugal compressor to fit a new and similar centrifugal compressor, and the adaptation is conducted by a scale-bias adjustment migration technology. In order to obtain the better estimated parameters of migration, Bayesian method, which takes the prior knowledge into consideration, is used in the sequential experiment. The approach is validated by a specific simulation bench. The results indicate that the applied approach can achieve a better prediction precision with fewer data of the new centrifugal compressor compared to pure GP method, and can model the new centrifugal compressor rapidly.

Keywords

Bayesian centrifugal compressor Gaussian process model model migration performance prediction

Preview



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