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A Comparison of Neural Network and DOE-Regression Analysis for Predicting Resource Consumption of Manufacturing Processes

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Abstract : Artificial neural networks (ANN) as well as Design of Experiments (DOE) based regression analysis (RA) are mainly used for modeling of complex systems. Both methodologies are commonly applied in process and quality control of manufacturing processes. Due to the fact that resource efficiency has become a critical concern for manufacturing companies, these models needs to be extended to predict resource-consumption of manufacturing processes. This paper describes an approach to use neural networks as well as DOE based regression analysis for predicting resource consumption of manufacturing processes and gives a comparison of the achievable results based on an industrial case study of a turning process.

Keywords : artificial neural network, design of experiments, regression analysis, resource efficiency, manufacturing process
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