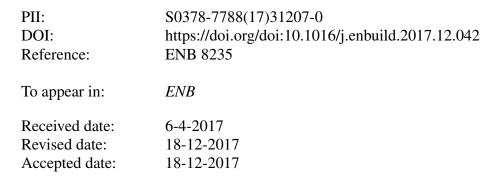# Accepted Manuscript

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Operational thermal load forecasting in district heating networks using machine learning and expert advice

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Abstract

Forecasting thermal load is a key component for the majority of optimization solutions for controlling district heating and cooling systems. Recent studies have analysed the results of a number of data-driven methods applied to thermal load forecasting, this paper presents the results of combining a collection of these individual methods in an expert system. The expert system will combine multiple thermal load forecasts in a way that it always tracks the best expert in the system. This solution is tested and validated using a thermal load dataset of 27 months obtained from 10 residential buildings located in Rottne, Sweden together with outdoor temperature information received from a weather forecast service. The expert system is composed of the following data-driven methods: linear regression, extremely randomized trees regression, feed-forward neural network and support vector machine. The results of the proposed solution are compared with the results of the individual methods.

Keywords: District heating, Data driven modelling, Machine learning, Aggregation rules, Expert advice, Ensemble methods

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