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# An air balancing method using support vector machine for a ventilation system

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## Abstract

In this paper, support vector machine method is introduced to solve air balancing problem for ventilation systems and a novel non-iterative air balancing method is presented. The proposed method provides a well-formulated form of air balancing problem for air ventilation system by i) building a mathematical model for duct system based on steady-state pressure balance; ii) constructing a pressure prediction model based on the system model and theory of support vector machine; iii) identifying the significant model parameters by support vector machine regression supervised machine learning; and iv) determining the damper positions based on the formulated model. The performance of the method is validated experimentally in a duct testbed with five terminals. The results demonstrate that the method can achieve the desired values within 4.6% relative error and is a promising approach for air balancing.

*Keywords:* Ventilation system, air balancing, Support Vector Machine (SVM), machine learning, model-based method, parameter identification, optimization, experiment.

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