

Advanced Thermal Prediction Model based on Neural Network for Energy Saving in Building HVAC System

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The BEMS(Building Energy Management System) has been introduced for the purpose of efficient management of energy consumption in buildings. However, most of BEMS does not have optimized startup and stop time of HVAC(Heating, Ventilation and Air Conditioning) system which can bring additional reduction of energy consumption. The algorithm proposed in this paper controls start and stop time of multiple VRF systems adaptively using artificial neural network so that energy consumption is reduced. And the algorithm enhances the efficiency of VRF by combining the VRF with ERV systems to lower the indoor thermal load. The performance is verified by building simulation with a building model which is equipped with multiple VRF and ERV systems based on U.S. Department of Energy Reference building. As the result of the algorithm with a combination of controlling the VRF and ERV systems, an average of about 11% and 0.5% energy savings against baseline was obtained respectively.