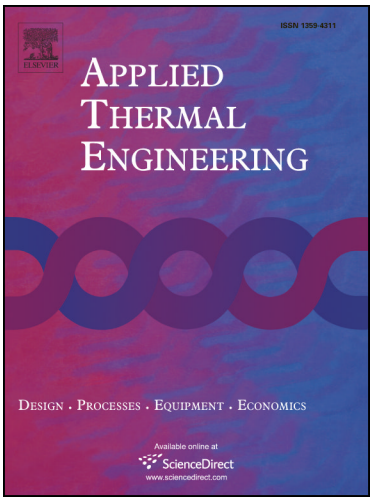

Research Paper

Rapid Temperature Prediction Method for Electronic Equipment Cabin

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Rapid Temperature Prediction Method for Electronic Equipment Cabin

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Abstract: An accurate model is very important for thermal prediction and thermal management of airborne electronic module. Thermal Network Model (TNM) is the commonly used to analyze transient thermal response. It cannot describe the nonlinear or time-varying temperature process very well. In order to realize a fast thermal modeling with a relatively high accuracy, this paper proposes a modeling method based on sliding time window Random Vector Functional Link Neural Network (RVFLNN). The input and output variables of RVFLNN are determined by analyzing the heat transfer relationship of studied system. This method can rapidly realize thermal modeling without a time-consuming iterative training process. In order to overcome the variability of studied system, the sliding time window technology is specially introduced to improve the model prediction accuracy. This method is applied to analyze thermal experimental data of electronic equipment cabin. The temperature prediction performance of presented method is compared with the traditional Artificial Neural Network Model (ANNM). Comparison results show that the proposed modeling method has the advantages of fast modeling and good prediction accuracy. This study can provide an effective way to describe a complex dynamic heat transfer process adaptively and accurately, which may help the thermal control scheme design.

Keywords : Electronic equipment cabin; Random Vector Link Neural Network;