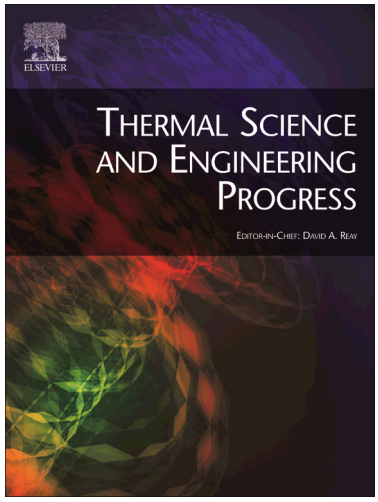

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Anas A. Rahman, Xiaoqing Zhang

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Prediction of Acoustic Wave Parameters of Thermoacoustic Prime mover through Artificial Neural Network Technique: Practical Approach for Thermoacoustics

Anas A. Rahman[a, b], Xiaoqing Zhang[a, *]

[a] Department of Refrigeration & Cryogenics, Huazhong University of Science and Technology, Wuhan 430074, China

[b] Department of Mechnical Engineering, Future University in Egypt, End of 90th st., Fifth settlement, New Cairo, Cario, 11835, Egypt

[*] Corresponding author. Email: zhangxq@mail.hust.edu.cn; Tel: +86 27 8754 2718; Fax: +86 27 8754 0724.

Abstract

Thermoacoustic prime movers are considered new alternative heat engines to traditional ones. For good performance of such a heat engine, a careful apparatus design is required. To predict the acoustic wave parameters responding to geometrical parameters of stack and resonator, is important for such a design. Artificial neural network (ANN) model is first proposed to predict the oscillating frequency and acoustic pressure amplitude, under given resonator length, stack length, stack plate spacing and thickness. ANN models for one standing wave thermoacoustic primemover had been developed based on published experimental data, and evaluated based on some criteria such as least mean square error between the predicted and actual outputs during the testing phase. Concerning oscillating frequency, ANN model with the configuration of 4-4-4-1 was adopted whilst 4-4-1 for acoustic pressure amplitude, namely 4 neurons representing the four input design