Journal of Acoustical Engineering Society of Iran, Vol. 8, No. 2, 2021

(Research Article)
Investigation of geometric parameters affecting the performance of acoustic vector sensors using a finite element method

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Received: 2019/06/10, Accepted: 2021/03/02

Abstract

The purpose of this numerical analysis is to deduce the temperature difference between the two heated wires of the sensor due to an imposed particle velocity. In this research, the effects of sensor geometric parameters such as changing the dimensions of the wires, the distance between the wires and how wires are placed over the sound direction. The sensitivity of sensors is investigated numerically**.** Numerical studies show that sensitivity is a function of frequency. With frequency increase from 100 to 1000 Hz, it is sharply reduced and then monotonic to zero. Also, been observed that the sensitivity is related to the position of the wires relative to each other and the dimensions of the cross-section of the wires, and sensitivity decreases by increasing the distance between the wires and the height of the cross section of the wires. Further, the sensitivity angle dependence has been investigated, and the observed sensitivity is related to how the wires are placed over the sound wave propagation and in parallel mode by increasing angle from zero to 90 degree, the sensitivity decreases.

Keywords: Numerical analysis, Acoustic vector sensor, Microflown, Sensitivity.

pp. 44-50 (In Persian)

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[DOR: 20.1001.1.23455748.1399.8.2.1.8]