Journal of Acoustical Engineering Society of Iran, Vol. 4, No. 1, 2016

Numerical investigation of flat plate trailing edge configuration effects on the flow behavior using large eddy simulation approach

H. Mohammadi[1], M. Ramezanizadeh[*2]

1. Center of Graduate Studies, Shahid Sattari Aeronautical Univ. of Sci. and Tech

2. Dept. of Aerospace Eng., Shahid Sattari Aeronautical Univ. of Sci. and Tech.

Abstract

In this research, the sound produced due to vortices interactions of unsteady flow over three different flat plates having various leading and trailing edges configurations, is investigated applying large eddy simulation approach. Validation of the simulated non-dimensional velocity at Mach number of 0.088 and Reynolds number of 4×10^5 is performed using available experimental results which showed good agreements. Also, considering the acoustic simulations, power spectral density of the sound received through two microphones (one located at 583 mm directly above and the other one located 583 mm directly below the trailing edge of the plate) showed good agreement with the experimental results. Based on the obtained results, values of sound power spectral density related to the first, second and third plates in the frequency range of 200 to 4000 Hz are approximately, 26 to 28, 27 to 32 and 28 to 57 dB, respectively.

Keywords: Aeroacoustic, Flat plate, Trailing edge vortex shedding, Large eddy simulation approach, Power spectral density.

pp. 43-53 (In Persian)

[DOR: 20.1001.1.23455748.1395.4.1.5.2]

[*] Corresponding author E-mail: ramezanizadeh@ssau.ac.ir