

Numerical Analysis on the Lighthill Sound Sources of Oscillating Jet

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ABSTRACT

We numerically have been studying the generation of sound pressure and pseudo-sound pressure from the oscillating jet based on the Lighthill acoustic analogy[1]. In recent works, it has been found using Howe's energy corollary that jet oscillations make some amount of acoustic energy, which becomes the sound sources of edge tone and flue instruments[2-5]. However, Howe's energy corollary is the indirect way for the estimation of aerodynamic sound energy[2].

In order to estimate directly the aerodynamic sound generation, we investigate the role of the Lighthill sound sources of edge tone. The Lighthill sources generate not only acoustic oscillations propagating to a far field but also pseudo-sound pressure (or fluid pressure) in a near field[6]. Thus, we will discuss with numerical simulations how many parts of the energy made by the Lighthill sources are transferred to that of the pseudo-sound pressure and how the small remainder contributes to the generation of the true acoustic oscillations.

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