

Abstract Submitted
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Numerical Simulations on Self-sustained Oscillations of Flows past Cavities YASUSHI WATANABE, Japan Aerospace Exploration Agency — Sound is generated by the interaction of a vortex with the corner of a cavity-like configuration during take-off and landing of an aircraft. This vortex formation may be coupled with a resonant acoustic mode of the cavity. Numerical simulations have been performed by solving compressible Navier-Stokes equations. These simulations were performed over a wide range of Reynolds number and thickness of the inflow boundary layer in the low subsonic regime. For the case of a relatively thin boundary layer at high Reynolds number, strong pressure oscillation is accompanied by a standing wave in the cavity. As the Reynolds number becomes lower, or the thickness of the boundary layer becomes sufficiently large, the standing wave inside cavity disappeared. The effect of this type of vortex-surface interaction on the sound radiation will be addressed. Moreover, the consequence of damping on the pressure oscillation will be described in terms of Reynolds number.

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