Abstract Submitted
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Computational Study of Circulation Control Aeroacoustics[1] YUE WU, KAN WANG, MENG WANG, University of Notre Dame — Circulation control is a promising method to argument the lift of airfoils and hydrofoils and enhance vehicle maneuverability. However, its acoustic effect is a significant concern and not well understood. In this study large-eddy simulations of a circulation control airfoil in a low-Mach-number flow are performed at a chord Reynolds number of 650,000 and three jet momentum coefficients. The acoustic radiation is calculated by solving the Lighthill equation using a boundary element method. The predicted sound pressure spectra show good agreement with the experimental measurements of Reger et al. (*J. Sound Vib.* Vol. 388, 2017). The Coanda jet is shown to suppress the low-frequency airfoil vortex-shedding noise, but at the same time causes a significant increase in broadband noise in the mid-to-high frequency range. The amount of increase grows with the jet momentum coefficient. High-frequency tonal noise is generated as a result of strong vortex shedding from the slot lip, and its magnitude and frequency also increase with increasing jet momentum coefficient.

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