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Flow Excited Helmholtz Resonator - Theory and Experiments
SCOTT MORRIS, University of Notre Dame, PAUL SLABOCH, RUOLONG MA, Notre Dame — Flow over the orifice of a Helmoltz resonator can result in a self excited resonance. The present research has focused on understanding this vortical-acoustic coupling by considering a simple control volume momentum analysis. A forcing term can then be identified, and considered in terms of a combined hydrodynamic-acoustic scaling. Direct measurements of the forcing were obtained using PIV for a range of speeds and orifice geometries. These measurements have motivated a simplified model for the forcing which allows accurate predictions of both the frequency and amplitude of the cavity pressure fluctuations.

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