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Attenuation of Self-Sustained Cavity Oscillations via Vortex Generators PHILIP BRENEMAN, DONALD ROCKWELL, Lehigh University — Turbulent inflow past either a free opening of a cavity, or along a perforated or slotted plate along the cavity opening, can give rise to self-sustained oscillations. At low Mach number, and in absence of wall elasticity, these oscillations may be viewed as purely hydrodynamic. Basic classes of co-rotating and counter-rotating vortex generators, located at the leading-edge of the cavity opening, have been critically evaluated as potential techniques of attenuation. High-image-density particle image velocimetry and unsteady pressure measurements lead to representations of the flow structure that are associated with maximum reduction of pressure amplitude. Moreover, global spectral analysis, based on simultaneous time records at thousands of grid points of the cinema imaging, provides further insight into the spatial patterns of the attenuated pressure amplitude. For a given configuration of vortex generator, the instability along a plate is attenuated to a smaller degree than the instability along the free cavity opening, thereby indicating it is highly robust.

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