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Techniques to Assess Acoustic-Structure Interaction in Liquid Rocket Engines

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ABSTRACT

Recent investigations related to the Space Shuttle have underscored the need to accurately model the interaction between acoustic energy and rocket engine components. In at least two recent instances, NASA has identified acoustic excitation in liquid propellant as a significant contributor to the high-cycle fatigue of Orbiter and Space Shuttle Main Engine (SSME) components. This seminar will discuss techniques for assessing the dynamics of rocket engine components that are in contact with fluid-filled enclosures. Of special interest are cases in which the lowest uncoupled acoustic natural frequencies of the enclosure are comparable to the *in vacuo* structural natural frequencies of interest. Such cases exhibit strongly-coupled system responses that can only be determined by considering the acoustic and structural problems simultaneously.