

Abstract Submitted  
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**Interaction of sound with an elastic plate in a duct**<sup>1</sup> MAHESH SUCHEENDRAN, DANIEL BODONY, PHILIPPE GEUBELLE, UIUC — The interaction of sound with a cavity backed elastic plate in a duct is studied using analytical and numerical methods. The problem consists of an incoming plane wave in an infinite duct with a finite elastic plate mounted flush on one of the walls of the duct. The analytic solution is found by series expansion of pressure in the cavity, duct and velocity of the plate using cosine and sine modes that satisfy the boundary conditions. Two separate boundary conditions for the plate are considered, simply-supported and clamped. The response of the plate is quantified by  $V_{rms}$ , the square root of integral average of velocity square of plate. A corresponding numerical simulation, based on first principles, of the same problem further illustrates the sound-plate interaction. Variation of  $V_{rms}$  of the plate with forcing frequency shows that the acoustic-structure interaction modifies the frequency of peak response from that of the natural frequency of the plate.

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