**Interaction of sound with an elastic plate in a duct**[1] 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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