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**Application of Conformal Transformations to Velocity Sources in Cavity Aeroacoustics** NATHAN MURRAY, University of Mississippi - NCPA, LAWRENCE UKEILEY, University of Florida - REEF — The surface pressure fluctuations observed in open cavity flows are related to the velocity sources present in the shear layer spanning the cavity opening. The relationship between these velocity sources and the pressure fluctuations can be expressed by Poisson's equation giving a functional description of $\nabla^2 p$. This relationship can be cast in an incompressible form, $\frac{1}{\rho}\nabla^2 p = f(\vec{x}, \vec{u})$, or in a compressible form, $\nabla^2 p = f(\vec{x}, \vec{u}, \rho)$. In either case, the source terms can be integrated to yield the resulting pressure at a point. In order to accomplish this integration for cavity flows, a conformal transformation is needed to project the cavity flow domain into a flat plate. Here, the required conformal transformation is defined and its effect on the integration domain is examined for incompressible, spanwise homogeneous, cavity flow. The results provide a look at the regions of the shear layer which directly affect the pressure at various locations along the streamwise extent of the cavity. These regions are then compared to dominant POD modes of the shear layer velocity.

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