

1124-35-414

George Avalos* (gavalos@math.unl.edu), PO Box 22560, Lincoln, NE 68588. *A Frequency Domain Approach for Uniform Stability of Solutions to a Structural Acoustics Interactive PDE.*

A rate of rational decay is obtained for smooth solutions of a PDE model which has been used in the literature to describe structural acoustic flows. This structural acoustics model is composed of two distinct PDE systems: (i) a wave equation, to model the interior acoustic flow within the given cavity Ω ; (ii) a structurally damped elastic equation, to describe time-evolving displacements along the flexible boundary portion Γ_0 of the cavity walls. Our main result is the derivation of uniform decay rates for classical solutions of this particular structural acoustic PDE, decay rates which are obtained without incorporating any additional boundary dissipative feedback mechanisms. In particular, in the case that full Kelvin-Voight damping is present in fourth order elastic dynamics, solutions which correspond to smooth initial data decay at a rate of $\mathcal{O}(t^{-1/6})$. By way of deriving these stability results, necessary a priori inequalities for a certain static structural acoustics PDE model are generated here; these inequalities ultimately allow for an application of a recently derived resolvent criterion for rational decay. This is joint work with Pelin Güven Geredeli of Hacettepe University (Ankara, Turkey). (Received September 14, 2016)