1145-93-2207　　　　**Scott Hansen*** (`shansen@iastate.edu`), Department of Mathematics, Iowa State University, Ames, IA 50011. *Controllability of a Cochlea with Localized Control on the Basilar Membrane.*

A model for the cochlea within the inner ear which consists of a one-dimensional basilar membrane modeled by an elastic beam or wave equation and an adjacent body of fluid, modeled as a linear potential fluid is considered. Exact controllability of the system is shown to hold with locally distributed control applied to an arbitrary open interval of the basilar membrane. As a step toward modeling a cochlear implant, we also consider the control problem with a piezoelectric patch over a portion of the basilar membrane. Some preliminary controllability results for this system will be described. The proof of controllability is based on mini-max eigenvalue estimates and application fo Ingham's inequality. (Received September 25, 2018)

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