

Semi-Analytical Investigation of Vortex Shedding Within the Glottis and Concomitant Effect on Vocal Fold Dynamics

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Phonation is a complicated and not well understood process, and, consequently, models which capture relevant flow physics with modest computational requirements are difficult to construct. In this talk, a two dimensional potential flow model of glottal flow is presented. The model employs the Schwarz-Christoffel mapping technique to obtain a flow within a confined and complicated flow domain. Advecting vortices are included in the model, and their influence on the flow field and corresponding aerodynamic loading on the medial surfaces of the vocal folds are recovered. This aerodynamic model is coupled to a reduced-order lumped-element dynamical tissue model, which is well documented in the literature, with the goal of studying the influence of the vortices upon the dynamics. Currently, steady surface pressure and force distributions have been obtained for various static configurations of the vocal folds.