Flow Induced Vibration and Glottal Aerodynamics in a Three-Dimensional Laryngeal Model

XUDONG ZHENG, QIAN XUE, RAJAT MITTAL, Johns Hopkins University, STEVEN BIELAMOWICZ, George Washington University — Three-dimensional effects associated with phonation remain unclear due to the lack of capability of simulating 3D fluid-tissue interaction in the past. To advance the state-of-the-art in this arena, an immersed-boundary method based flow solver coupled with a finite-element solid dynamics solver is employed to conduct high-fidelity direct-numerical simulations of phonation in a 3D model of the human larynx. Three-dimensional vibration patterns are captured along with turbulence effects and three-dimensional vortex structures in the glottal jet. Results from these simulations are presented.

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