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4. Phonation energy utilization and vocal efficiency estimated from measurements in a physical model of the human vocal system[1]
MICHAEL KRANE, PAUL TRZCINSKI, ZACHARY YOAS, Applied Research Laboratory, Penn State University — Measurements performed in the Penn State Upper Airway Model of acoustic pressure, transglottal pressure, volume flow, and glottal area are presented. These are used to estimate flow work terms of the integral energy equation, applied to the vocal system, to identify principal power transfers during phonation. These terms are estimated for the larynx, the vocal tract, and complete system. Each power flow is then classified as an input, output, or loss mechanism, according to the sign of the average power transfer per cycle. Efficiencies for each subsystem, and the system as a whole, are then presented as the ratio of output to input power per cycle.

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