pressures, which are validated by measurements taken at the same locations. Since the field acoustic pressures are calculated directly, the nonuniqueness difficulties inherent in the Helmholtz integral formulation are no longer existent and the efficiency of numerical computations is significantly enhanced. [Work supported by NSF.]

12:00

5aSAb6. An efficient method to calculate the radiated pressure from a vibrating structure. Sunghoon Choi and Yang-Hann Kim (Dept. of Mech. Eng., KAIST, Sci. Town, Taejon 305-701, Republic of Korea)

An alternative formulation of the Helmholtz integral equation, derived by Wu *et al.* [J. Acoust. Soc. Am. **103**, 1763–1774 (1998)], expresses the pressure field explicitly in terms of the velocity vector of a radiating surface. This formulation, derived for arbitrary sources, is similar in form to Rayleigh's formula for planar sources. Because the pressure field is expressed explicitly as a surface integral of the particle velocity, which can be implemented numerically using standard Gaussian quadratures, there is no need to use the boundary element method to solve a set of simultaneous equations for the surface pressure at the discretized nodes. Furthermore the nonuniqueness problem inherent in methods based on Helmholtz integral equation is avoided. Validation of this formulation is demonstrated first for some simple geometries. This method is also applied to general vibro-acoustic problems in which both the surface pressure and velocity components are unknown. [Work sponsored by Ministry of Education, Korean Government under the BK21 program and Ministry of Science and Tech., Korean Government under National Research Lab. program.]

FRIDAY MORNING, 7 JUNE 2002 GRAND BALLROOM 2, 8:30 A.M. TO 1:00 P.M.

Session 5aSC

Speech Communication: Speech Potpourri: Production and Signal Processing (Poster Session)

Fredericka Bell-Berti, Chair
Department of Speech Communication Sciences and Theatre, St. John's University, 8000 Utopia Parkway, Jamaica, New York 11439

Contributed Papers

All posters will be on display from 8:30 a.m. to 1:00 p.m. To allow contributors an opportunity to see other posters, contributors of odd-numbered papers will be at their posters from 8:30 a.m. to 10:45 a.m. and contributors of even-numbered papers will be at their posters from 10:45 a.m. to 1:00 p.m.

5aSC1. Reaction time of voluntary modulations in voice *F0* during sustained pitch vocalizations. Jay J. Bauer, Charles R. Larson (Dept. of Commun. Sci. and Disord., Northwestern Univ., 2299 N. Campus Dr., Evanston, IL 60208), and Kathryn C. Eckstein (Univ. of Tennessee, Memphis, TN 38163)

In an attempt to more clearly understand the neural control of voice, a reaction time study was designed to investigate how rapidly normal subjects, i.e., nontrained singers, can voluntarily increase or decrease their voice fundamental frequency ($F0$) during sustained vocalizations when cued with a 1000-Hz auditory tone stimulus. Results revealed that overall reaction times (RTs) ($F=21.9$, $df=2$, 150, $p=0.01$) for upward $F0$ modulations occurred faster (range: 138–176 ms) than downward responses (range: 196–234 ms). In contrast to the reaction time findings, slightly higher peak velocities were observed for downward responses compared to upward responses. Shorter RTs observed for $F0$ elevation are therefore possibly related to central mechanisms involved in the planning of or execution of the direction in which $F0$ is to be modulated instead of muscle biomechanics. The fastest RTs obtained from the present study (138 ms) are slightly longer than the reflex latencies of the initial pitch-shift reflex response (100–130 ms) [Burnett, J. Acoust. Soc. Am. **103** (1998)], and provide additional evidence that subjects normally respond to inadvertent changes in their voice $F0$ with a fast, but limited reflex, followed by a secondary voluntary response. [Research supported by NIH Grant No. DC07264.]

5aSC2. The influence of phonotactics and phonological similarity on speech production. Michael Vitevitch, Duncan Eshelman, and Jonna Armbruster (Dept. of Psych, Univ. of Kansas, 1415 Jayhawk Blvd., Lawrence, KS 66047, mvitevit@ku.edu)

Phonotactic probability refers to the frequency with which segments and sequences of segments appear in a word or syllable. Neighborhood density refers to the number of words that are phonologically similar to a target word. These variables have been shown to influence word recognition, but little work has examined how these variables influence speech production. Although these two variables are positively correlated in English, words that varied orthogonally on these characteristics were selected and presented in a picture-naming task to assess the speed and accuracy of lexical retrieval during speech production. The results suggest that both facilitative and competitive processes operate during lexical retrieval in speech production. The implications for models of speech production are discussed. [Work funded by NIH-NIDCD R03 DC 04259.]

5aSC3. A physically informed glottis model for real glottal flow wave form reproduction. Carlo Drioli (TMH, Dept. of Speech, Music and Hearing, Royal Inst. of Technol., Drottning Kristinas v. 31, Stockholm SE 10044, Sweden, drioli@dei.unipd.it)

A physically informed model of the glottal source is proposed. The model relies on a lumped mechanoaerodynamic scheme based on the mass-spring paradigm. The vocal folds are represented by a mechanical