ABSTRACTS OF MANUSCRIPTS SUBMITTED FOR PUBLICATION

THE N-TUBE FORMULA AND SOME OF ITS CONSEQUENCES

L.J. Bonder. Accepted for publication in Acustica vol. 52.

ABSTRACT

The vocal tract can be modelled as a lossless n-tube: a system of n coupled cylindrical segments with equal segment lengths. In this paper we derive a formula from which a configuration in terms of an n-tube model can be related to its formant frequencies, and vice versa. We discuss some properties of the model, and show that there are, in general, several possible configurations that correspond to a given set of formant frequencies. It turns out that there is no need to model the glottis as closed, as several authors did. Consequently, the production of vowels is a resonance problem, not an eigenvalue problem.

EQUIVALENCY OF LOSSLESS N-TUBES

L.J. Bonder. Accepted for publication in Acustica vol. 52.

ABSTRACT

The inverse problem of the lossless speech production model doesn't have a unique solution: there exists a continuous set of tubes that have the same formant frequencies. This phenomenon is known as articulatory compensation in literature. In this paper we describe a method with which we can compute the continuous set of n-tubes that have the same formants. It follows that the problem can be handled analytically up to 10-tubes. We illustrate our analytic method on the basis of 4-tubes. It turns out that the values of the shape parameters of the tubes are restricted to certain intervals. Consequently, for some vowel sounds the corresponding 4-tube configurations must show particular shape characteristics, in spite of the articulatory compensation.

CHANGING THE SHAPE OF LOSSLESS N-TUBES

L.J. Bonder. Accepted for publication in Acustica vol. 52.

ABSTRACT

In this paper we investigate analytically the acoustical effects of small changes of the shape of lossless n-tubes. We derive, by means of a decomposition method, general formant shift formulae for n-tubes. This method is not based on the use of eigenfunctions, but on the geometrical interpretation of the n-tube formula in the formant space. We give some examples of classes of changes of tube shape with their acoustical effects in the F_1-F_2-plane.

ANALYSIS OF THE PERCEPTUAL QUALITIES OF VOICE AND PRONUNCIATION OF DUTCH SPEAKERS

W.P.F. Fagel. Submitted for publication.

ABSTRACT

This study aims at the development and validation of a maximally reliable and at the same time efficient instrument for the description of voice and pronunciation quality of Dutch speakers. It is based on perceptual judgements obtained from Dutch speaking listeners. A semantic differential was constructed based on the results of earlier experiments and after an extensive study of literature on speech rating experiments. Recordings of 10 speakers, all reading the same text aloud, were rated on 35 bipolar 7-point scales by 235 listeners. Factor analyses on different subsets of the data as well as on the total data set showed a very stable orthogonal structure, typically consisting of 5 dimensions that might be called 'melodiousness', 'articulation quality', 'voice quality', 'pitch' and 'tempo'.
A rating form consisting of 14 items is proposed for use in future research.

ERRATUM

Among the abstracts of manuscripts submitted for publication there is one of a paper entitled "Analysis of the Perceptual Qualities of Voice and Pronunciation of Dutch Speakers" (p. 120). Through a regrettable coincidence only one of the authors was mentioned. The names of L.W.A. van Herpt and L. Boves should be added as co-authors of the paper concerned which has been accepted for publication in "Speech Communication".

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