Ph.D. lecture

Over-Exposure Effects on the Distortion Product OtoAcoustic Emission

- Broadband and Finestructure -

by

Karen Reuter
Acoustics, Department of Electronic Systems, Aalborg University

Time: Friday, 24th November 2006 at 10:00 a.m.
Place: Aalborg University, NOVI Auditorium, Niels Jernes Vej 10

Adjudicators: Glenis R. Long, Ph.D., Professor at the City University of New York, USA
Torsten Dau, Dr. Rer. Nat., Professor at Acoustic Technology, Techn. University of Denmark
Henrik Møller, Professor at Acoustics, Dept. of Electronic Systems, AAU (chairman)

Supervisor: Dorte Hammershøi, Associate Professor at Acoustics, Dept. of Electronic Systems, AAU

Chairman: Sofus Birkedal Nielsen, Associate Professor at Acoustics, Dept. of Electronic Systems, AAU

ABSTRACT

OtoAacoustic Emissions (OAEs) are sounds which are produced by the healthy inner ear as part of the normal hearing process. They can be recorded with a sensitive microphone placed in the ear canal. The presence of OAE is associated with a good state of hearing; reduced OAE levels can be associated with hearing-loss. Reported measurements of OAEs before and after noise exposure suggest that OAE is a more sensitive measure for the hearing function than pure-tone audiometry and therefore might be a measure for the early identification of hearing loss. No individual diagnosis of OAEs is possible today, however.

In the present study it was investigated whether Distortion Product OtoAcoustic Emission (DPOAE) parameters exist, which indicate the early stage of a hearing loss. DPOAE was obtained with high frequency resolution, and its characteristic spectral fine structure was analyzed. Data of subjects belonging to different groups of age and exposure history were obtained and compared. Controlled sound/noise exposure experiments were performed to observe changes in DPOAE characteristics.

The DPOAE of all tested subjects feature the typical fine structure pattern. The fine structure pattern is highly individual and stable over time. No unequivocal relation between the characteristics of the DPOAE fine structure and the state of hearing could be found. It is suggested to eliminate the DPOAE fine structure in the DPOAE measurement and to establish a reference zero from a large amount of DPOAE data, to which individual DPOAE levels can be compared.

After the defence Acoustics will host a reception – from approx. 1 p.m.

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Please note that on the same day IDA (The Danish Society of Engineers) invites you to attend a guest lecture by Professor Glenis R. Long, which takes place from 2 p.m. in the same lecture hall at NOVI. The title is:

Quick and objective hearing diagnostic

IDA members please register at www.ida.dk, arrangement: 62537