3:35

2pAB8. Pattern adaptation in midbrain and medullar auditory units of the frog. Nikolay G. Bibikov (N. N. Andreyev Acoust. Inst., Shvernik St. 4, Moscow 117036, Russia)

The responses of medullar and midbrain auditory cells to prolonged amplitude-modulated tone stimulation were recorded extracellularly in the dorsal medullar nucleus, superior olive and torus semicircularis of curarized grass frogs (*Rana temporaria*). The majority of the cells with tonic response to tone bursts showed a significant adaptation in their firing rate within first 20 to 30 s and then stabilized gradually. The temporal course of the rate adaptation was approximated by a single or double exponent plus a steady component corresponded to sustained firing. The dependence of the time constant of the rate decrease and the sustained firing value upon mean carrier intensity, modulation depth and modulation frequency have been studied for 128 medullar and 105 midbrain units. Generally, adaptation was stronger for midbrain versus medullar units. In each auditory nuclei the adaptation decreased with the increase in carrier intensity and modulation depth. The weakest adaptation (the highest value of sustained rate) was usually observed when a low-frequency noise was used as a modulating waveform. The comparison to the mammalian central auditory units is discussed.

3:50

2pAB9. The fish swimbladder as an acoustic waveguide. David T. I. Francis (School of Mathematics and Statistics, Univ. of Birmingham, Edgbaston, Birmingham B15 2TT, UK) and Kenneth G. Foote (Woods Hole Oceanogr. Inst., Woods Hole, MA 02543)

The possible role of the fish swimbladder as a sound-sensing organ is investigated using numerical models based on the boundary-element method. A number of gadoid specimens are considered. For each specimen, wire-frame models of the swimbladder surface are derived from morphometric data. The response of each swimbladder to a continuous incident wave is calculated at discrete frequencies up to 50 kHz. Pressure distributions within the swimbladders and velocity distributions on the surfaces are presented. Results reveal high-pressure and high-velocity regions around the anterior horns of the swimbladders. [This work originated in European Community RTD—Contract No. MAS3-CT95-0031 (BASS).]

TUESDAY AFTERNOON, 5 JUNE 2001 SALONS III/IV, 1:00 TO 5:30 P.M.

Session 2pBB

Biomedical Ultrasound/Bioresponse to Vibration and Signal Processing in Acoustics: Novel Imaging Techniques in Biomedical Ultrasound

Christy K. Holland, Chair
Department of Radiology, University of Cincinnati, 234 Goodman Street, Cincinnati, Ohio 45219-2316

Chair's Introduction—1:00

Invited Papers

1:05

2pBB1. 3-D compound imaging with refraction and motion correction. Paul L. Carson, Jochen F. Kruecker, Gerald L. LeCarpentier, Charles R. Meyer (Dept. of Radiol., Univ. of Michigan, Kresge III, R3315, Ann Arbor, MI 48109-0553), and J. Brian Fowlkes (Univ. of Michigan, Ann Arbor, MI 48109-0553)

The early goal of multiview imaging was delineation of quasi-specular image boundaries. Medical compound imaging was partially replaced because of resolution loss by refraction, misregistration, and tissue motion, and completely replaced due to incompatibility with real-time imaging. Three potential improvements in: boundary delineation, volumetric contrast-to-noise ratio, and Doppler anisotropy reduction (BC&D) have remained an attraction of compounding. Now marketed, in-plane compounding in real-time and in extended field of view imaging offer the potential for in-plane, image-based reregistration of multiple views. Image volume-based registration (IVBaR) of separate angular views in 3-D data sets allows full 3-D displacement corrections. Compounding out of the image plane (elevational compounding) increases the number of independent views, increasing potential yield from improvements BC&D. Our work has been in elevational compounding with conventional linear arrays, in contact with, and partially moving the proximal tissues. IVBaR using the mutual information metric and thin plate spline interpolation of warped volumes has produced exceptional reclamation of spatial resolution along with the expected improvements BC&D. Full-volume, warped registration, and a faster, subvolume registration have been compared *in vivo* and with realistic beam aberrations in test objects. [Work supported in part by PHS Grant No. R01HL54201 from the NHLBI.]