BE16-A.3

"A Nonlinear Model for Kemp Echoes"
R. Newcomb, P. Gomez, and V. Rodellar, University of Maryland, College Park MD, USA, and Univ. Politecnica de Madrid, Madrid, Spain

11:20 – 11:40

A Nonlinear Model for Kemp Echoes
R. Newcomb*, P. Gómez and V. Rodellar
University of Maryland, College Park, MD 20742 USA and Universidad Politécnica de Madrid, Madrid, Spain

Kemp Echoes are under investigation as a noninvasive means of characterizing and diagnosing damage to inaccessible parts of the ear. For this characterization signal processing techniques are used to set up a lattice digital synthesis filter from the Kemp Echo data. The parameters of the lattice are also determined in terms of the material properties of the ear. By comparing the two determinations of the lattice, structural anomolies of the inner ear can be isolated. Because second order effects are important to the interpretation of Kemp Echoes, nonlinearities become significant to this technique as a diagnostic tool. Nonlinearities due to membrane and fluid interactions within the ear are incorporated in the Kemp Echo lattice model presented.

Supported by NATO Grant 0395/87 and NSF Grant MIP 85-06924.

"Model Structure and Parameter Estimates for the Source Derivation of Auditory Brainstem Responses"
S. Kahtoh, T. Sekiya, M. Aruga, K. Yamazaki, and M. Saito, Teikyo University of Technology, Chiba, Japan

11:40 – 12:00

Model Structure and Parameters Estimates for the Source Derivation of Auditory Brainstem Responses, S.Kahtoh*, T.Sekiya, M.Aruga, K.Yamazaki and M.Saito,
* Teikyo University of Technology, 2289-23,Otani, Uruido, Ichihara, Chiba, Japan

To obtain significant findings on ABR generators, ABRs to sine wave stimuli,were recorded in 10 normal Ss. The stimuli rang-ed from 50 to 80 dB HL at between 0.1 and 1.0 KHz for more 512 responses, were given to both ears simultaneously. The responses within 10.24 ms, were recorded between the vertex and earlob with common grand at the frontal, and represented as a continuous curve in the complex plane in which separate plots for phase and vector length as function of frequency were shown. By using this result, we obtained the frequency characteristic of ABRs and used a fortran computer program to fit a linear transfer function to given frequency response magnitude and phase data. A conjugate search was used that minimizes the integral of the absolute value of the error squared between the model and the data. The transfer function model suggested that ABRs have three vectors as model parameters,which are proportional, derivative and second order lag element.

BE16-A. AUDITORY SYSTEM RESEARCH (Rm 207)—Chair: Charles C. Finley, Research Triangle Institute, Research Triangle Park, NC, U.S.A.; Co-Chair: C. Yoshimoto, Hokkaido University, Sapporo, Japan

10:30 a.m.–12:20 p.m.

BE16-A.1 Design Considerations for Auditory Prosthesis—C. Finley*

BE16-A.2 A New Model of Extracochlear Prosthesis for the Profoundly Deaf—Y. Hirata*, T. Ifukube, J. Matsushima, and N. Hoshimiya

BE16-A.3 A Nonlinear Model for Kemp Echoes—R. Newcomb*, P. Gomez, and V. Rodellar

BE16-A.4 Model Structure and Parameters Estimates for the Source Derivation of Auditory Brainstem Responses—S. Kahtoh*, T. Sekiya, M. Aruga, K. Yamazaki, and M. Saito

BE16-A.5 A Neuro-Synaptic Model of Pitch Perception with Auditory Memory—K. Itoh*

BE17. ANALYSIS AND CONTROL OF MOVEMENT (Rm 206)—Chair: J. Goldberg, Baylor College of Medicine, Houston, TX, U.S.A.

10:30 a.m.–12:20 p.m.

BE17.1 Biodynamic Response Determination to Transitory Acceleration—P. Frisch* and F. Lambert

BE17.2 Cinematic and Dynamic Gait Analysis—F. Pelisse, D. Geiger*, and F. Marie

BE17.3 Portable Gait Laboratory: Preliminary Results—D. Aronson, H. Kang*, V. Musselman, and A. King

BE17.4 VAT-Vestibular Autorotation Test-In the Clinic and in Weightlessness—A. Månsson* and S. Vesterhauge

BE17.5 The Variability of a Simple Learned Movement—R. Kirsner* and E. Byrne

BE17.6 Analysis of Self-Induced Hand Oscillation as a Model of Physiological Tremor—A. Watanabe*, K. Goto, and M. Saito

BE1-E. ELECTROPHYSIOLOGY 5: FUNCTIONAL NEUROMUSCULAR STIMULATION (Centro C)—Chair: J. Thomas Mortimer, Case Western Reserve University, Cleveland, OH, U.S.A. Sponsored by IEEE/EMBS

1:20–3:10 p.m.

BE1-E.1 Upper Extremity Assist Devices—P. Peckham*, M. Keith, G. Thrope, K. Stroh

BE1-E.2 Functional Electrical Stimulation of the Paralyzed Larynx—I. Sanders*

BE1-E.3 Cardiac Assist Device—L. Stephenson*

BE1-E.4 Collision Block of Motor Activity in Peripheral Nerve—J. Sweeney*, J. Mortimer, D. Bodner, and A. Ferguson

BE3-E. MEASUREMENTS OF CARDIAC PERFORMANCE 2 (Rm 203)—Chair: R. Beyar, Technion-Israel Institute of Technology, Haifa, Israel; Co-Chair: L. Maughan, Johns Hopkins Hospital, Baltimore, MD, U.S.A.

1:20–3:10 p.m.

BE3-E.1 Magnetic Resonance Imaging Assessment of Regional Ventricular Function—J. Willerson*

BE3-E.2 Cardiac Structure and Function Quantitated with Multislice Computed Tomography—N. Chung and E. Ritman*

BE3-E.3 Measurements of Left Ventricular Shape and Function—S. Sideman*, H. Azhari, U. Dinnar, and R. Beya

BE4-E. CLINICAL ENGINEERING 5: ETHICAL ISSUES IN HEALTH CARE TECHNOLOGY (Centro A)—Chair: Subrata Saha, Louisiana State University Medical Center, Shreveport, LA, U.S.A.; Co-Chair: C. W. Hall, Southwest Research Institute, San Antonio, TX, U.S.A.

1:20–3:10 p.m.

BE4-E.1 Ethical Codes in Biomedical and Clinical Engineering—An International Comparison—J. Persson*

BE4-E.2 Biomedical Innovations: The Role of Ethics—M. Maxey*

BE4-E.3 Ethics in Clinical Medicine—C. Hall*

BE4-E.4 Should Bioethics Training Be a Part of Clinical Engineering Curriculum?—S. Saha* and P. Saha

BE4-E.5 Protecting the Rights of Human Research Subjects—H. Wigodsky*

BE4-E.6 Professional Society Impact on the Status of Clinical Engineering as a Profession—G. Goodman*

BE5-E. ORTHOPEDICS 5: SPINE BIOMECHANICS (Plaza D)—Chair: K. Sadasivan, Louisiana State University Medical Center, Shreveport, LA, U.S.A.; Co-Chair: Michael Manley, Osteonics, Allendale, NJ, U.S.A.

1:20–3:10 p.m.

BE5-E.1 A Biomedical Analysis of the Steffee Plated Thoracolumbar Spine—S. Courtney*, J. Lipka, S. Saha, and J. Albright

BE5-E.2 The Biomechanics of L-Rod Interlock to Prevent Sideway of the Scoliotic Spine—G. McNeice* and B. Allen Jr.

BE5-E.3 The Biomechanics of Neck Trauma-Injury Envelopes and Applications to Gymnastics—G. McNiece*, T. Oxland, and P. Scott

BE5-E.4 Space Truss—A Systems Approach to Cervical Spine Mechanics—S. Levin*

BE5-E.5 Research on Mechanics of the Spine—Z. Dongming*, S. Changzhu, X. Yanghe, Z. Hua, and S. Jingfang

BE5-E.6 The Biophysics of the Spine in the Evolution of Man on the Earth—M. Romano*

BE5-E.7 Biomechanic Research of Treating in the Thoracic and Lumbar Vertebrae Compressed Fracture—G. Yun-wu, W. Xiao-tong*, and H. Hui

BE5-E.8 Experimental Study on Effect of Spine Transmitting Vibration—L. Zhentian* and L. Runnan

BE6-E. RESPIRATION 5: MECHANICAL VENTILATION (Plaza B)—Chair: D. Gerstmann, Southwest Foundation for Biomedical Research, San Antonio, TX, U.S.A.; Co-Chair: P. Niederer, University of Zurich, Zurich, Switzerland. Sponsored by ICMMB

1:20–3:10 p.m.

BE6-E.1 One and Two Dimensional Wave Mechanics Models for Oscillating Flows in Respiration—M. Epstein*, F. Moslehi, M. Pisani, and J. Ligas

BE6-E.2 Anesthesia Ventilator—T. Cadena and F. Prieto*

BE6-E.3 Microcontroller for a Volumetric Respirator—M. Martínez*, A. López, and A. Jiménez

BE6-E.4 Respiratory Drive Monitor Integrated in a Ventilator—L. Hellström*, B. Hallén, and D. Linnarsson

BE7-E. BIOLOGICAL SYSTEMS MODELING 5: MODELING ASPECTS OF CARDIAC ELECTROPHYSIOLOGY (Centro D)—Chair: F. A. Roberge, University of Montreal, Quebec, Canada. Sponsored by BMES

1:20–3:10 p.m.

BE7-E.1 Parameter Estimation in a Model of the Electrical Activity of a Single A-V Nodal Pacemaker Cell—C. Murphey*, J. Clark Jr., W. Giles, and G. Naccarelli

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