

Effect of electromechanical coupling in the middle ear with implantable hearing device

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Abstract: The middle ear is the smallest biomechanical system of human being which sometimes has to be modified to improve hearing process. An implantable middle ear hearing device (implant) is one of the most innovative method of hearing loss treatment. Therefore, an explanation of the active implant role in the middle ear structure and its influence on the human ear dynamics is the main aim of the paper. The multi degrees of freedom nonlinear biomechanical model of the middle ear should generate interesting nonlinear phenomena especially when the system is coupled to an electrical system of the implant. An interaction between the mechanical and electrical system will be source of additional phenomena that have not been investigated in the literature before. The coupling coefficient, defined as a constant or nonlinear relation has the main role in system dynamics. That problem will be investigated in the paper.

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