

عنوان مقاله:

A Fast Approximate Method for Predicting the Behavior of Auditory Nerve Fibers and the Evoked Compound Action Potential (ECAP) Signal

محل انتشار:

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خلاصه مقاله:

Background: The goal of the current research is to develop a model based on computer simulations which describes both the behavior of the auditory nerve fibers and the cochlear implant system as a rehabilitation device. **Methods:** The approximate method was proposed as a low error and fast tool for predicting the behavior of auditory nerve fibers as well as the evoked compound action potential (ECAP) signal. In accurate methods every fiber is simulated; whereas, in approximate method information related to the response of every fiber and its characteristics such as the activation threshold of cochlear fibers are saved and interpolated to predict the behavior of a set of nerve fibers. **Results:** The approximate model can predict and analyze different stimulation techniques. Although precision is reduced to $<1.66\%$ of the accurate method, the required execution time for simulation is reduced by more than 98%. **Conclusion:** The amplitudes of the ECAP signal and the growth function were investigated by changing the parameters of the approximate model including geometrical parameters, electrical, and temporal parameters. In practice, an audiologist can tune the stimulation parameters to reach an effective restoration of the acoustic signal.

کلمات کلیدی:

Approximate method, auditory nerve fiber, cochlear implant, evoked compound action potential growth function, model

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