Read Me

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Content

The cochlear model can be run using '*Saremi2015.m*' script. This script yields the frequency response and the position-frequency map of the cochlea. The fundamentals of this model have been described in Saremi and Stenfelt (2013). However, the code has evolved significantly since that publication.

'*diagnosis_HL.m*' script takes in an audiogram as an input runs the Nelder-Maud optimization method to find cochlear pathologies that have caused the given hearing threshold elevations, according to the model.

Examples

1) '*IO_Saremi.m*' script produces cochlear input/output functions (defined as the RMS output at the CF as a function of input intensity) for healthy cochlea versus a passive (dead) cochlea as shown in Fig. 7 of Saremi and Stenfet (2021) article.
2) '*Reproduce_OHC_diagnosis*' runs the '*diagnosis_HL.m*' for a real-world clinical case and shows how the model relates hearing loss (in form of audiometric threshold elevations) to a specific configuration of OHC lesions. This script produces Fig. 11 of Saremi and Stenfet (2021) article.

System requirements

The code has been evaluated on MATLAB 2017 version. It is advised to use multiple-core fast computer systems when running the Nelder-Maud optimization since this is a computationally heavy code.