

ETH master program

Module: Physical Modeling and Simulation

Project: 2-D Acoustic Analysis Using Finite Difference Time Domain Method

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Description:

Starting from the available 2-D scalar FDM solver for electrodynamic problems it is necessary to solve a 2-D acoustic problem resembling a simplified human eardrum presented below. The expected outcome of the project:

- Theoretical description of the 2-D FDM acoustic problem (IBVP and its discretization by using FDM) for computing propagation of an acoustic wave in the chosen 2-D eardrum like arrangement.
- Computing and visualization of the pressure field at three different frequencies (0.1 kHz, 1kHz, and 10kHz).
- The corresponding Matlab code (or a code written in any other language of your choice).

Geometry:

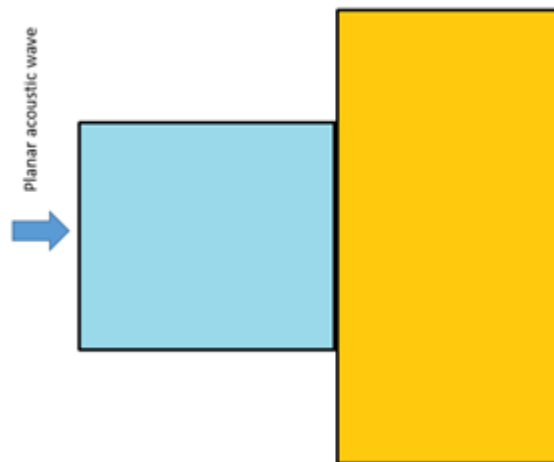


Figure 1. A human eardrum arrangement is presented. An air filled channel (light blue) guides waves onto a membrane behind which a liquid filled chamber with acoustic nerves is located. More details can be found in the text.