Master MIR – Underwater Acoustics
2022-2023

Homework 2

Let us consider a water channel, 350 m in depth, and let us assume that the velocity c is constant and equal to 1500 m/s. A signal is transmitted from a point-like source in the water and measured by a set of 9 receivers located along a vertical line at depths 25*n meters, $1 \leq n \leq 9$. When hitting the (flat) boundaries, the acoustic waves are totally reflected.

The file 'Received.mat' contains a 9 x 32000 array which provides the 9 received signals during 6.4 s with sampling path dt = 2.e-04 s. Line n corresponds to the receiver at depth 25*n meters.

Plot the received signals and explain how you can get a rough estimation of the location of the transmitter from the various time delays. Improve the accuracy of this first estimate thanks to the simulation of the back propagation of the time-reversed received signals.