13.853 Computational Ocean Acoustics
Homework #3
Assigned: Session 10
Due: Session 13

Problem 1

In the previous homework set you wrote a MATLAB script for computing the depth-dependent Green's function using the DGM approach. Write an equivalent script using the propagator matrix approach, for the same stratified environmental model, including an upper halfspace which may be fluid (e.g. air) or vacuum, a sequence of up to 4 fluid layers, and a lower, fluid halfspace. The horizontal wavenumber should be complex, $k_r = k_r(1 - i\delta)$. The source may be present in any of the layers and halfspaces.

Both codes should be made compatible with the input routines you put together in problem set 1. Plan on making a live demo in class on Oct. 17.

Compare the two approaches for the following problems:

- The Pekeris waveguide problem in JKPS Fig.2.25
- The same problem, but adding a 5 m thick high-speed layer, $c = 3000\text{m/s}, \rho = 2.0\text{g/cm}^3$ at the seabed. Investigate the stability of the two solution techniques vs frequency.