Homework #7 • MATH 462 • Surface Waves

- submit your write-up Friday 12 March (1pm).

A) Finite Depth Fluid (3 pages, 10pts) Give a complete discussion for the derivation of the travelling wave solution to the linearized surface wave equations with a bottom boundary (located at $y = -H$). Summarize clearly the formulas for the PDE solutions and the wavespeed. Note that the ratio $c(k, H)/c(k, \infty)$ is only a function of one variable, make a plot and explain what it tells. Quality of presentation will be a significant part of the grade for this problem.

B) Flow over a Wavy Streambed (3 pages + 2 plots, 10pts) Problem 3.5 (p112, Acheson). Give a careful explanation of the PDE formulation and solution. Modify the matlab plotting routine *w08wave.m* to show the flow arrows. What are the differences in the flow patterns for the two cases?