MAST602: Introduction to Physical Oceanography
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Wave Practical Exercises

Introduction: You find the following java applets on the web at

http://www.coastal.udel.edu/faculty/rad/superplot.html
http://www.coastal.udel.edu/faculty/rad/linearplot.html

These sites claims to instruct you on the superposition of linear waves with differing wave lengths, periods, amplitudes, phase, and group velocities. The application was written several years ago by Prof. Tony Dalrymple, one of 15 smart people listed by Wired (Oct.-2008 issue) to advise the next president of the U.S.A., i.e., http://www.wired.com/politics/law/magazine/16-10/sl_dalrymple

Problem: This media attention, however, attracted hackers to this site who may have changed the code. Suspects include a disgruntled graduate student, an envious faculty member, and an instructor of another class who wants to exploit the site for experiential learning.

Task: In groups of 2-3 people, please conduct a comprehensive set of experiments to

a) discover and describe potential inconsistencies between the results shown on the site and theoretical expectations (you will need to take lots of measurements of relevant wave properties to prepare tables and graphs); start with a set of theoretical expectations to test.

b) determine if the results shown are for waves in shallow or deep water, note that both water depth and wave amplitude are adjustable parameter. [Does g equal 9.81 m/s^2?]

c) it appears that at least two waves are needed to experimentally determine a group velocity, yet in class you were told that each wave has its own group velocity; how could you test the concept at the above site, given that you have 4 individual waves to work with? How many wave groups can you create?

Deliverables: A hand-written report of relations to be tested (at least 3), experimental set-up, tables of parameters chosen, tables of data measured and observed, rough graphs sketching expected theoretical results along with your observations. This pre-liminary report is to document your work and results for later more detailed analysis, discussion, and write-up. A copy of it is due by the end of class.

Resources: (a) Knauss (1997, chapter-9), (b) internet access, (c) class notes Sept.-30, 2008 posted at http://newark.cms.udel.edu/~muenchow/MAST602 ; (d) graphing paper, pencil, and, most importantly, (e) a sharp mind.