## Summary: Experiments, 9 May 11, page 126–129.

In the dropbox folder are 20 data files labeled with names like:

e$n$-9may11-pinkave.txt
e$n$-9may11-black.txt

with $n = 1, 2, ..., 10$. The value of $n$ corresponds to the number of the experiment. There are 10 experiments in which we varied the water depth and the wave amplitude. There were three gage racks, each with 5 gages, spaced 42 cm apart. Rack 1 was closest to the wavemaker and had pink wires, thus the name "pink". Rack 2 had white wires - the calibration for this whole rack went awry, so none of the "white" data were useable. Rack 3 had black wires and was furthest from the wavemaker.

So, the "pinkave" amplitudes are always larger than the corresponding "black" amplitudes because of viscous decay.

Then "black" refers to the data from gage 3 on the black rack, which was on top of pressure gage #4. The pink gage 3 was on top of pressure gage #2. But, the data from that gage were consistently a few millimeters higher than photographs of the waves taken at that location.There is ambiguity because you can't see cross-channel variations in the photograph, and the meniscus is a few millimeters. So, the "pinkave" data files are an average of gages 2, 3, and 4 on the pink rack. We did not have photographs corresponding to the "black" data.

The water depth and number of points are listed at the bottom of each data file.

The "pinkave" files have one column of data: the time series of the average of the three pink gages. The output from the three gages were calibrated and shifted so that the peak for all three time series occurred at 5 s. Then they were averaged.

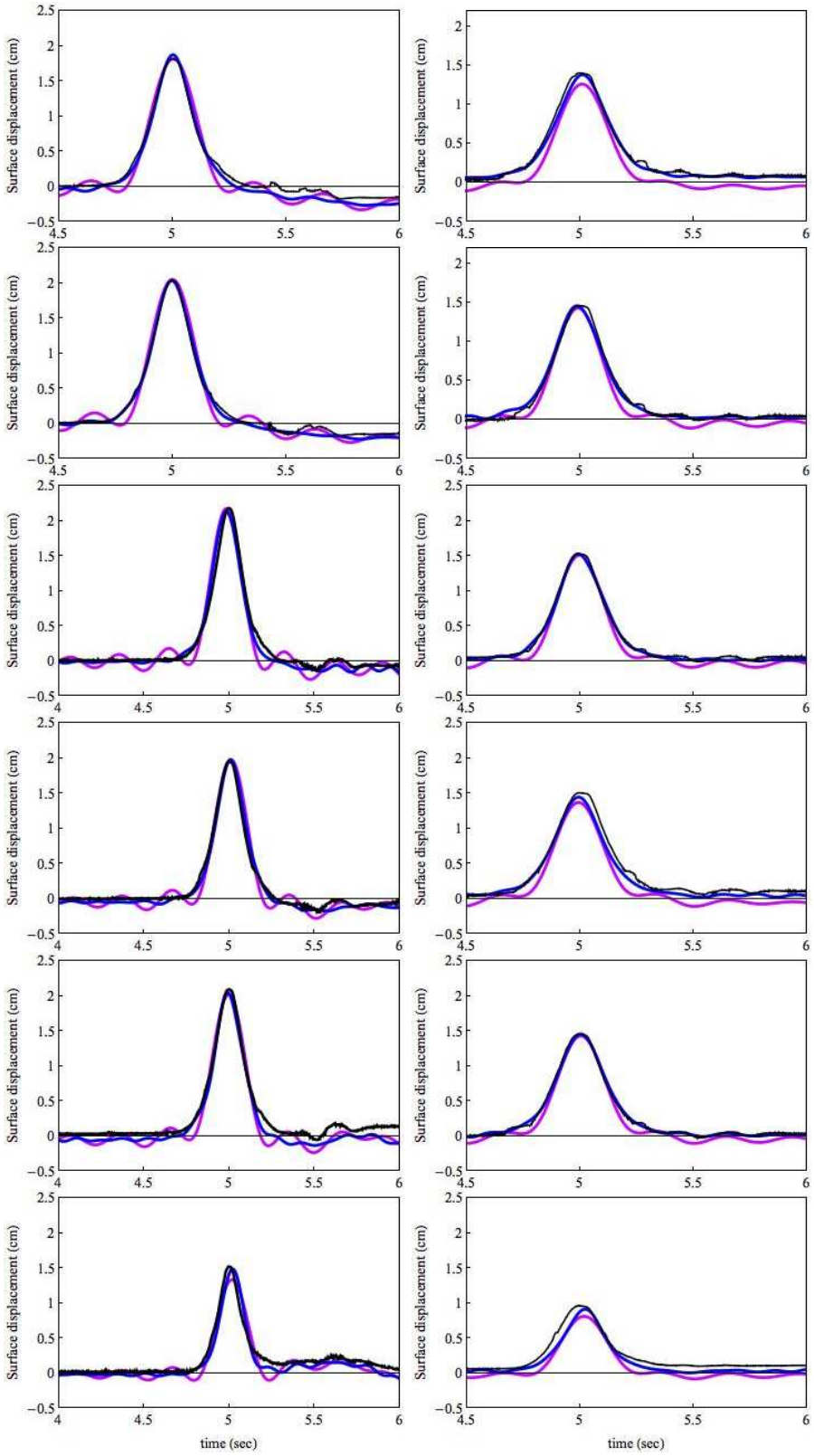
The "black" files have two columns of data. Column 1 is the time series from pressure gage #4. The second column is the time series from capacitance, surface gage #3 on the black rack. These two columns have the same number of data points (15000).

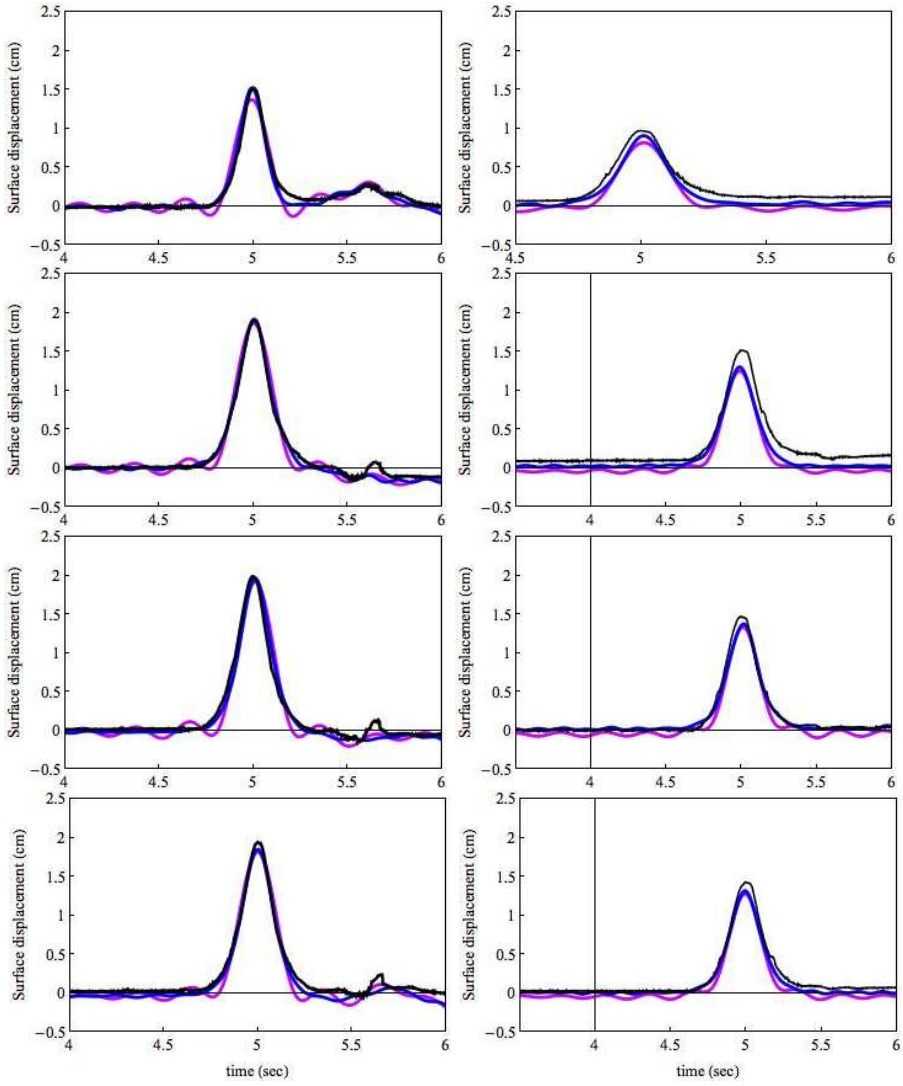
The "black" data have been calibrated, but nothing else.

The pressure data is very noisy, with a high-frequency noise of about 0.05 (+/- 0.025). (The units are cm, because of the calibration, which is hydrostatic.). When I analyze the pressure data, to use Vishal's formula, I FFT it and then reproduce the signal with 100 modes. By looking at the FFTs, the first 100 modes correspond to amplitudes of about .05cm. I have not given you the filtered data, so that you can analyze it however you want to.

When I analyze the data, I shift the surface and pressure time series to make the main peaks occur at 5 s. That way they line up and are easier to compare. I have not given you the shifted data (except for the "pinkave"), because they correspond to the filtered and put-back-together-pressure data. Sometimes, this shift could be better - I have not fine-tuned it, because these figures won't be used for anything.

The following figure shows a comparison of the data with the linear theory and with Vishal's formula. The $n$th row corresponds to the $nth$ experiment. The first column is the "pinkave" data, closest to the wavemaker. The second column is the "black" data furthest from the wavemaker. The purple curve is from linear theory. The blue curve is Vishal's formula. The black curve is the surface, capacitance gage data.


Surface displacement (cm)
time (sec)


Surface displacement (cm)
time (sec)