PHY407H1 Lab8

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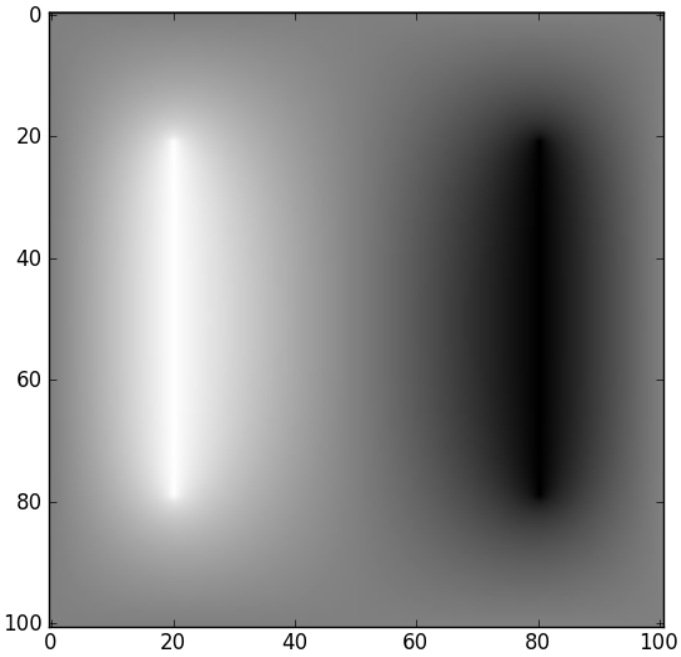
QUESTION 1

See Lab8_q1.py by Chi.



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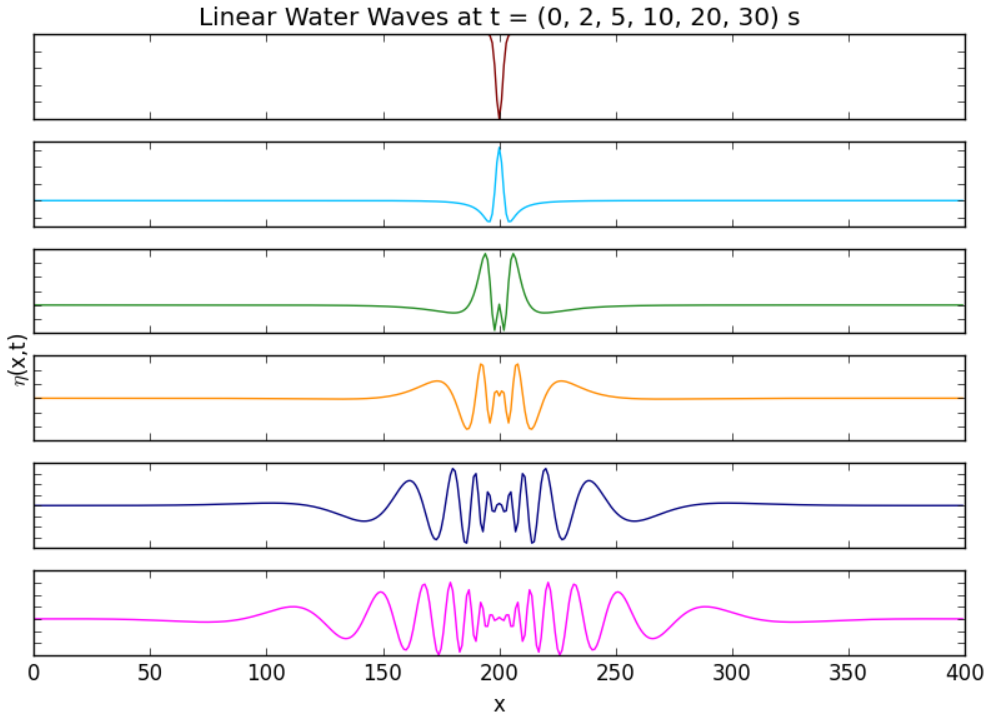
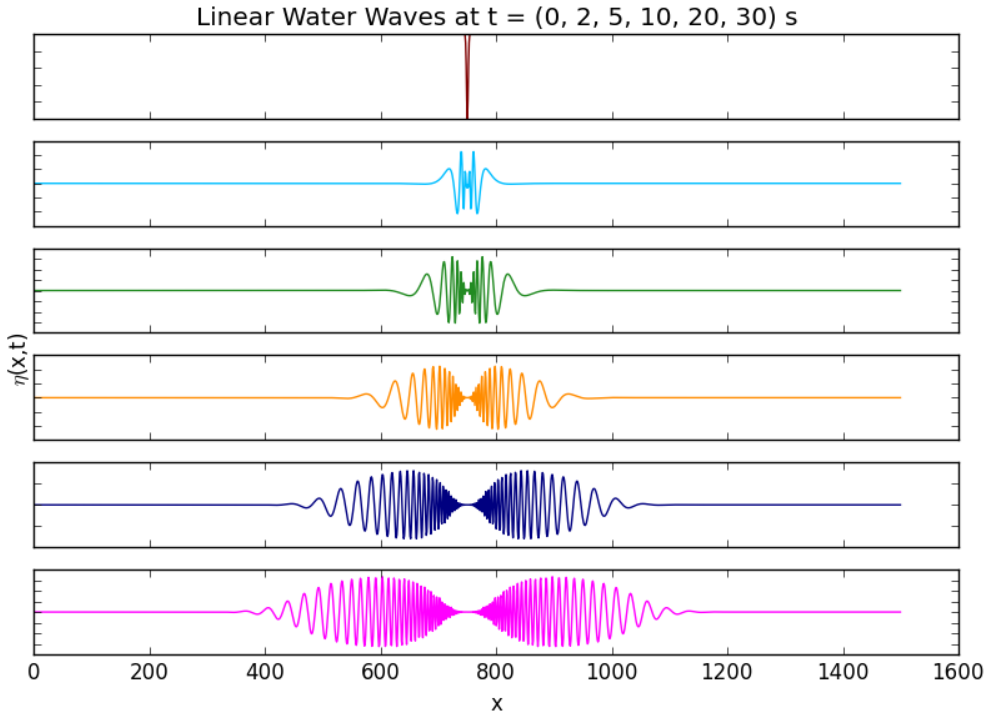
QUESTION 2

a) See pseudo code Lab8_q2a_pseudocode.txt by me.
b) See Lab8_q2a.py by me. Also plotted the times at 10s, 20s, and 30s to make sure I was doing it right.



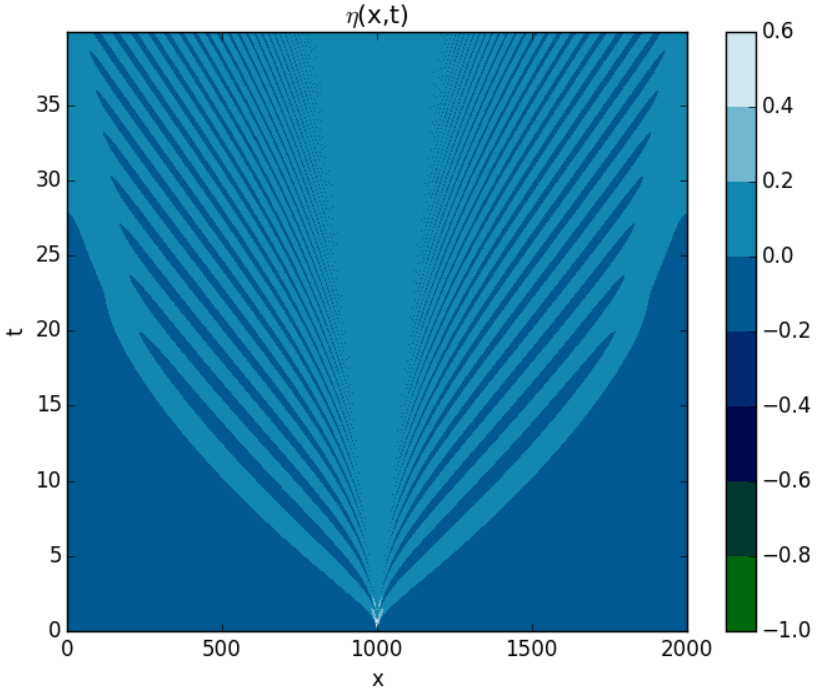
This took only 18 seconds to run.

c) See Lab8_q2c.py by me. When I increase h, the run time goes up. I have tried adjusting L to compensate for the initial conditions. The parameters used were h = 0.5, nsteps = 300, and L = 2000 m.



In comparison, this simulation took 87 seconds to run.

d) See Lab8_q2d.py by me. I plotted the contour plots of η(x,t)



I notice that as time evolves, the Gaussian bump spreads out in opposite directions. The shortest waves are located at the ends, and the longer waves are located at points closer to the peak. Looking at two crests/troughs, it seems like the wavelength is around 18m. In part c), the wave packet is more easily seen. From the looks of this, the wave packet moves 150m/s.

QUESTION 3

See Lab8_q3.py by Chi.