**Homework #2**

ENG 342, Fall 2016

Due: Thursday, October 25, at the beginning of class.

1. *Problems from the book* (70 pts)

* Section 13.1: 2, 6, 7, 9, 12, 15
* Section 13.3: 1, 3, 4, 5, 6
* Section 13.4: 1, 2, 5, 6, 7, 8, 10, 11
* Section 13.5: 1, 2, 4, 5, 6, 9, 11, 12

The underlined problems are the ones you are required to submit. That being said, you should attempt all the problems listed, as their concepts are still fair game for quizzes and the final.

Each problem should detail the steps necessary to arrive at the solution. Please keep in mind that your final answers should always be simplified as much as possible. Also, I may only grade a subset of the underlined problems, so please put the same amount of effort into each one.

Extra points may be given for typesetting in LaTeX (<https://www.latex-project.org)>.

1. *Plucked String Computer Simulation* (30 pts)

The plucked string arises from a particular form of the Wave equation that we discussed while covering Section 13.4 in class.

Take your solution to problem 7 of Section 13.4. Letting h = 1, a = 1, and L = π, use MATLAB to do the following:

* *Displacement over time*: Plot u(x,t) over x for various values of t: 0.0, 0.5, 1.0, 1.5, 2.0, 3.0. Each choice of t should be in a different subplot.
* *Standing waves*: Plot the fifth standing wave over x for the same values of t as above. Each choice of t should be on the same graph.
* *Discussion*: Are your plots consistent with the problem statement? Why or why not? Be sure to discuss the initial condition u(x,0) in your answer.

For the plots, your submission must include both the MATLAB code to generate the plot and the plot itself. Your code should be able to run as-is (if the printed version were to be typed into a computer) and generate the printed plot exactly. On the plots, all axes should be labeled, and legends/titles included as necessary to identify each curve.

Extra points may be given for MATLAB code that is vectorized, i.e., doing computations through vector/matrix manipulation rather than for/while loops.