

## Homework 3 - Math 133

### Due Thursday, Feb. 5th

Instructor: Mauro Maggioni

**Office:** 293 Physics Bldg.

**Office hours:** Tuesday 4pm-5:30pm.

[www.math.duke.edu/~mauro/teaching.html](http://www.math.duke.edu/~mauro/teaching.html)

I prefer homework written in pen rather than pencil. The handwriting and organization of your work on the page should be clear. Include appropriate explanations for what you are doing in your calculations and why, and what conclusions you draw or observations you make.

The homework should include a printout of the Matlab code you used and of the Matlab output (including figures). Also send me a copy of the Matlab code via e-mail: if you have multiple files, compress them into a unique zip file. Name the file as `FamilyName.FirstInitial.Homework_xx.zip`, where `xx` is the homework number. This will apply to all the future homework as well. The subject line of the e-mail should be "Math 133 homework".

A (\*) indicates an exercise which gives no points, and is therefore not required, but should be considered as a suggestion. It will be corrected and graded. I keep track of correct (\*) exercises for each of you.

(1) Problem (1) page 80. (6 points)

(2) Problem (2) page 81. (10 points)

(3\*) Problem (3) page 81. (\*)

(4) An homogeneous bar of length 1 has its left end at temperature 0 and its right end at temperature 2. Suppose it reaches equilibrium, i.e. the temperature function inside is independent of time. What is the temperature profile at equilibrium? Use equation (3.4). Explain why you do not need to know  $k$ . (6)

(5) Problem 3 page 98. (10 points)

(6) Problem 8 page 100. (12 points)