MATH 480 A: FOURIER ANALYSIS AND ITS APPLICATIONS

ASSIGNMENT 3

Due Monday April 20:

- Read Chapter 2 through page 56, §2.6 optional.
- **R** problems for class discussion: §2.2, page 37, #1,2,3. §2.4, pages 47-48, #1,3,7,12.

Due Wednesday April 22:

- **R** problems for class discussion: §2.4, page 48, #7
- Additional problem **R**: Two rooms have been held at 20°C for so long that the thick wall (6π cm.) between them is also at 20°C throughout. Suddenly the air in both rooms is replaced by air at 0°C, and is held at that temperature. Assume that the interface between air and wall is perfectly conducting. (This is bad physics; we will replace this with a more realistic assumption in a couple of weeks.) Find the temperature in the wall as a function of position and time. Your solution will be in terms of the *thermal diffusivity* k. Hint: Problem # 7 in §2.4 page 48 should be useful.

Due Monday April 27:

- Read Chapter 3: §3.1 and §3.2.
- **TI** problems: §2.1, page 31, #18. §2.2, page 37, #4. §2.3, pages 42-43, #2,5. §2.4, page 48, # 9. (To be submitted on gradescope by 8pm).
- Additional problem **TI**: A thin, homogeneous cylinder 2 feet long at a uniform temperature of 10 degrees is placed end to end with a cylinder of the same size, shape, and material at a uniform temperature of -10 degrees. The interface is perfectly conducting and all other sides are perfectly insulated. Find the temperature as a function of position and time. Your solution will be in terms of the *thermal diffusivity* k. Hint: Problem # 9 in §2.4 page 48 should be useful. (To be submitted on gradescope by 8pm).
- **E** problems: §2.2, page 37, #5,6. §2.3, page 43, #6,7. §2.4, page 48, #2,6.