Physics 360/Math 360 MWF 11:00 - 11:50 PM, Room: CST 314

Instructor: Michael Lerner, CST 213, Phone: 765-983-1784

Assignment 8, Due Wednesday at noon

1 The wave equation

1.1 Additional problem

Argue that the wave equation is a reasonable physical model for waves. You may make this argument for 1D, 2D, or 3D waves. Does it seem reasonable for both longitudinal and transverse waves? You may use the book, the internet, or whatever resources you'd like, but make sure to cite your sources. Your argument should be motivated from *physical* considerations, not just mathematical ones. If you answered this with a physical argument last time, feel free to repeat that artument.

1.2 Boas §13.1

Boas 13.1.2

2 Diffusion/Heat Flow; Schrodinger

2.1 Boas §13.2

13.2.3, 13.2.7

2.2 Boas §13.3

13.3.1; you must also write down the rest of the answer to Example 1. It's perfectly fine to use the book as a reference *before* you write you answer, but I want you to write it out in your final form without looking at the book.

3 Steady State Temp in a Rectangular Plate

3.1 Additional problem

Most of the problems we've been solving involve an infinite number of terms in the solution. With appropriate boundary conditions, this is not required. Solve the semi-infinite rectangular plate problem with one side of the plate held at

$$T = \sin\left(\frac{-2\pi x}{L}\right) + \cos\left(\frac{3\pi x}{L}\right) \tag{1}$$

How many terms do you find in your solution, a finite number, or an infinite number?

If it's finite, why should that be true conceptually? How could you change the initial conditions so that there were an infinite number of terms?

If it's infinite, why should that be true conceptually? How could you change the initial conditions so that there were a finite number of terms?