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Assignment 7, Due Tuesday April 9th and Friday April 12th

1   This part due on Tuesday

1.1   Directional Derivative and Gradient

Boas §6.6 # 1, 2, 5

1.2   Line Integrals

Boas §6.8 (Line integrals) # 1, 6, 8

2   The wave equation

Argue that the wave equation[1] 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*.

3   This part due on Friday

3.1   Conceptual Understanding

In the style of Fenyman, and including pictures, write out a proof of either the divergence theorem or Stokes' theorem. You're free to spend as much time studying Feynman as you like *before* doing this problem. But, while you're writing it out, you must put away all references. You can re-do the problem until you've completed it fully in a "closed-notes" fashion.

3.2   Green's theorem in the plane

Boas starts out with Green's theorem in the plane. Look at her section. Explain how one can derive that from what we covered in Feynman.

3.3   Divergence and Curl

First! give yourself no more than 10 seconds each to write down on a piece of paper whether you think the divergence and curl for each of the remaining parts of the worksheet are zero, positive, or negative.

Now, write up your solutions for all six parts of the worksheet we did in class.

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[1]What is the wave equation? Look in Boas Ch. 13, or on the internet!