Physics H190
Spring 2013
Homework 6
Due Friday, March 15, 2013 at 5pm

Reading Assignment: The lecture last Wednesday mostly concerned some remaining topics in tensor analysis and the definition of the metric tensor, plus an introduction to the Klein-Gordon equation. Last week I posted some notes on tensor analysis from another class (Appendix E from Physics 221). This week I have posted some handwritten notes on the same subject that are a little closer to my actual lecture. You may find them a little easier, in that they only cover topics that I covered in lecture and not much more.

I have also posted some notes from Physics 221A on the Klein-Gordon equation. Please read Secs. 2, 3 and 5 of these notes. Those notes are short, and if you want to read the whole thing you'll find out why the Klein-Gordon equation was rejected by Schrödinger and everyone else for the first few years of its existence.

The Klein-Gordon equation is the "scalar field" referred to by Mukhanov and Winitzki in Chapters 1 and 4 of their book. Following them, we shall use the scalar field as a simplified version of the real physical fields (electromagnetic, etc) when developing a simplified understanding of particle creation in the early universe, the Casimir effect, and other topics. I have posted two more chapters of the book, Chapters 5 and 6. Chapter 5 discusses some classical field theory, as I have been doing in lectures, but it presupposes some background in general relativity so you may not be able to follow it in detail. But you should be able to recognize action functionals, functional derivatives, and other things we have talked about. We will continue with the Klein-Gordan field in lecture next Wednesday.

1. Send me a question, from the lecture, notes, book, or homework. There is nothing to turn in this week.