

Physics 129b
Problem Set Number 1
Due Wednesday, January 16, 2008

Notes about course:

- Physics 129b is devoted to “group theory”, as used in physical applications. Ph 129c is devoted to probability and statistics.
- The book “Group Theory in Physics” by Wu-Ki Tung is the text for Ph 129b. I have also prepared lecture notes on some of the topics we will cover. These will be available on the web page for the course. Chapter 16 of Mathews&Walker provides a nice overview also. I’ll mention some other resources as we go along.
- Grades will be entirely on homework, that is, there will be homework sets as usual instead of a midterm or final.
- Homework will be handed out Wednesday, due the following Wednesday.
- Collaboration policy: OK to work together in small groups, and to help with each other’s understanding. Best to first give problems a good try by yourself. Don’t just copy someone else’s work – whatever you turn in should be what you think you understand.
- There is a web page for this course, which should be referred to for the most up-to-date information. The URL is:
<http://www.hep.caltech.edu/~fcp/ph129/>
- I may have solutions to some of the problems on my web site. Do not look at these until after you have turned in the problem set!

Reading: Read the first two chapters of Wu-Ki Tung for motivation and basic concepts. The course note labelled “Group theory basics” contains a shorter version of this material. One possible way to approach the reading is to read the course notes, with the text serving as a more detailed reference when needed.

Note: Use of books and the internet to get over hurdles is permitted. However, just looking up the answer in these resources and copying it into your solutions is not permitted. It is important to do the work yourself to develop an understanding of the material (I believe this even when things get a little tedious). If you have done the work and wish to use a resource to check your answer, that is all right, but I would like you to give a reference in this case. A few first problems to get you going:

1. "Group theory basics" note, exercise 1.
2. "Group theory basics" note, exercise 2.
3. "Group theory basics" note, exercise 3.
4. "Group theory basics" note, exercise 4.

You will want to save your work on problems 3 and 4 for later reference.