Physics 618 Thirteenth Lecture Feb. 28, 2017

Last time we started our classification of all simple compact Lie algebras by defining simple roots and ordering the roots. We found all roots are positive or negative, and all positive ones are positive sums of the simple ones, there are as many simple roots as the rank of the algebra, and the angles between the simple roots are limited to four values. We started investigating how this constraint limits the posible simple compact Lie algebras. We defined Dynkin diagrams and then excluded various subdiagrams, so soon we will have found all the possible simple finite-dimensional compact Lie groups.

After finding the four infinite series of these algebras, and the five exceptional ones, we will talk about notation that mechanizes the procedure for finding the other roots of the algebra, which I have just added to the notes. Then we will turn to finding the finite dimensional unitary representations.

Reminders:

There will be a midterm exam on Tuesday, March 7. This will cover the material from the beginning through Dynkin diagrams (Chapter 8) and finding the other roots (the new chapter 9, Finding the Other Roots). It will be closed book, but you are allowed two sheets of $8\frac{1}{2} \times 11$ inch handwritten notes.

Homework 6 will be due Thursday, March 2. It has been posted. There will not be homework next week — just prepare for the exam.