Marco Zambon
Metodos Matematicos da Fisica
Fall 2009

Ficha de unidade curricular

Goals

The goal of the course is to teach some of the mathematical notions that appear in physics and, to some extent, how they relate to the physics known to the students.

Competences and learning results

The course focuses on two main subjects: Symplectic geometry and representation theory.
In the first part of the course, together with the basics of symplectic geometry, the students learn how it allows to describe classical mechanical systems and their symmetries (Noether's theorem).
In the second part of the course the students learn about Lie groups, Lie algebras and their representations. Emphasis is put on two kinds of representations: of compact groups, which parallels the theory for finite groups, and of semisimple complex Lie algebras. This allows to show how representation theory appears in modern physics (the weights of certain representations of the complex semisimple Lie algebra sl(3,C) correspond to particles: baryons, quarks etc).

Teaching methods

The course consists of 4 hours of lectures every week and of the assignment of homework problems every 2 weeks, which are graded and returned to the students.

Methods of assessment

A final exam took place on Jan. 18, 2010, and a second final exam – taken by one student – took place in February 2010.