Mathematical Theory of Control

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Timetable: approximately 16 hrs. First lecture on November 19, 2018, 08:30 (dates already fixed, see calendar), Torre Archimede, Room 2AB/40.

Course requirements:

Examination and grading: The final exams will consist of either a standard oral questioning on the main parts of the program or of a shortened recognition of the program together with the dissertation on a research paper previously studied by the student.

SSD: MAT/05

Aim:
This course aims to provide the student with some basic tools, like non-linear ordinary differential equations (and their relation with first order ODE’s) and set separation, which allow one to attack the main questions of the so-called Theory of control. The latter include minimum problems, which generalize one-dimensional Calculus of Variations to constrained dynamics, and the controllability question, namely the study of the set that can be reached starting from a given initial position by means of the controlled dynamics. Besides being a natural extension of some classical issues in Mathematical Analysis and Differential Geometry, Control Theory is very much motivated by applications, from Aerospace Engineering, to Medicine and Economics.

Course contents: