

Averaging and Asymptotic Behavior in Deterministic Optimal Control

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Timetable: 12 hrs. First lecture on March 24, 2015, 14:00 (dates already fixed, see the calendar), Torre Archimede, Room 2BC/30.

Course requirements:

Examination and grading:

SSD: MAT/05

Aim:

Course contents:

This serie of lecture will concern the limit behavior of the value function defined through a Cesaro mean or the Abel mean of an integral cost. The problem consists in investigating the existence of a limit value when the averaging parameter converges (the horizon tends to infinity for Ceasaro mean, the discount factor tends to zero for Abel Mean).

The introductory part is devoted to the ergodic control theory : It concerns several cases where the limit value exists and is independent of the initial condition. Characterizations of the limit trough viscosity solutions will be provided together with a rate of convergence though basic weak KAM theory.

The central part concerns the non necessary ergodic case. It concern cases where the limit value exist and may depend on the initial conditions. Characterization of the limit value will be provided through suitable invariant measures for the control systems. A detailed study of occupational measure and invariant measure of control systems will be provided.

The last part concerns cases of averaging more general concept of means than Cesaro or Abel ones. This part could also contains extension to differential games, to stochastic control or to some problems of homogeneization.