

## Docente: Alfio Borzì

Affiliazione: Universität Würzburg, Institut für Mathematik, Chair Scientific Computing.

## Durata del Corso: 20 Ore

## **Titolo:**

Kinetic Models and Related Optimal Control Problems

## Abstract:

These lectures introduce kinetic models describing the evolution of probability or material density functions, and to related optimal control problems of open- and closed-loop type.

In particular, stochastic processes of drift-diffusion-jump type and piecewise deterministic processes are presented, together with the corresponding Fokker-Planck equations. Furthermore, alternative descriptions of diffusion processes in the framework of Boltzmann equations are discussed.

These models allow to accommodate deterministic control functions of the underlying microscopic processes with the purpose to follow a given trajectory or reach a given target state at final time. These objectives are formulated in terms of cost functionals of tracking type or as ensemble cost functionals. Theoretical results and numerical approximation and optimization procedures are presented. Some applications and extensions of the proposed control frameworks are discussed.