DISMA Dipartimento di Scienze Matematiche G. L. Lagrange

ECCELLENZA 2018 • 2022

POLITECNICO DI TORINO

3-6 July 2018

Politecnico di Torino, Aula 7D (third floor)

Angelo VULPIANI

Ordinario di Fisica Teorica presso il Dipartimento di Fisica

Università di Roma "La Sapienza"

TRANSPORT OF INERT AND REACTING MATERIALS

Short Course

Contents

The course will focus on passive transport phenomena both of inert (e.g. pollutants in the Oceans or the atmosphere) and reacting (i.e. chemical reactions) solutes. The key topics which will be addressed are Chaos, the relations with Stochastic Processes and applications in both biological and technical frameworks.

I General aspects of diffusion
- 1.1 Brownian motion and Fokker-Planck Equation
- 1.2 Diffusion in deterministic systems
- 1.3 Lagrangian Chaos

II Standard and anomalous diffusion
- 2.1 The multiscale method for the asymptotic behaviour of the Fokker- Planck Equation
- 2.2 Anomalous Diffusion

III Front propagation
- 3.1 Some basic ideas on reaction-diffusion systems
- 3.2 The classical result for the front propagation for reaction-diffusion in 1D (Fisher-Kolmogorov-Petrovskii-Piskunov)
- 3.3 Front propagation in stirred media
- 3.4 The geometrical optics limit in laminar flows
- 3.5 Reaction-diffusion on graphs

Schedule

Tue 03 July 16:00 - 17:30, Aula 7D
Wed 04 July 11:30 - 13:00, Aula 7D
Thu 05 July 16:00 - 17:30, Aula 7D
Fri 06 July 11:30 - 13:00, Aula 7D

Organizer: Lamberto Rondoni

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