PH.D. IN MATHEMATICS AND COMPUTER SCIENCE
COURSE SCHEDULE
ACADEMIC YEAR 2022/2023

PROCESSES, FOKKER-PLANCK EQUATIONS, AND RELATED OPTIMAL CONTROL PROBLEMS

LECTURER: ALFIO BORZÌ
UNIVERSITY OF WÜRZBURG

20 - 23 MARCH

THESE LECTURES PROVIDE AN INTRODUCTION TO STOCHASTIC PROCESSES, THE CORRESPONDING FOKKER-PLANCK-KOLMOGOROV EQUATIONS, AND RELATED OPTIMAL CONTROL PROBLEMS.

STOCHASTIC PROCESSES OF DRIFT-DIFFUSION TYPE AND PIECEWISE DETERMINISTIC PROCESSES ARE PRESENTED. CORRESPONDING TO THESE DIFFERENT STOCHASTIC PROCESSES, DIFFERENT FP EQUATIONS ARE OBTAINED. IN PARTICULAR, FP EQUATIONS OF PARABOLIC AND HYPERBOLIC TYPE ARE DISCUSSED.

FOKKER-PLANCK (FP) EQUATIONS MODEL THE TIME EVOLUTION OF PROBABILITY DENSITY FUNCTIONS (PDF) OF STOCHASTIC PROCESSES AND ALLOW TO DESIGN DETERMINISTIC CONTROL FUNCTIONS OF THESE 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 ENSEMBLE COST FUNCTIONALS.

THE FOCUS OF THE LECTURE IS ON A GENERAL DRIFT-DIFFUSION STOCHASTIC PROCESS AND THE CORRESPONDING PARABOLIC FP EQUATION. FOR THIS CASE, THEORETICAL RESULTS AND NUMERICAL APPROXIMATION AND OPTIMIZATION PROCEDURES ARE PRESENTED IN DETAIL.

SOME APPLICATIONS OF THE FP CONTROL FRAMEWORK TO DIFFERENT MODELS ARE DISCUSSED.

CLASS SCHEDULE:

MON 20/03   10:30 - 13:30

TUE   21/03   15:00 - 18:00

WED 22/03   10:30 - 13:30

THU   23/03   10:30 - 13:30

- **CLASSROOM MT 10**

- **ONLINE:HTTP://BIT.LY/3YTI1RF**