



复旦大学数学科学学院 数学综合报告会

报告题目: PDE Controllability

报告人: AvH Professor Enrique Zuazua (Friedrich-Alexander-Universität Erlangen-Nürnberg)

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地点: 光华东主楼1801

报告摘要:

Controllability theory for Partial Differential Equations (PDEs) lies at the crossroads of analysis, geometry, and applications. It addresses a fundamental question: to what extent can we steer the evolution of a distributed system, governed by a PDE, toward a desired state by acting through suitable inputs or controls? Over the past decades, controllability has matured into a vibrant field, with key results for parabolic, hyperbolic, and dispersive equations, and with deep connections to optimization, numerical analysis, and, more recently, machine learning.

In this lecture, I will present the main ideas and techniques underlying PDE controllability: observability inequalities, unique continuation principles, microlocal analysis, and Carleman estimates. I will also highlight several emblematic results, from exact controllability of the wave equation to null controllability of the heat equation, and discuss the interplay between control cost, geometry, and system dynamics.

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