



复旦大学数学科学学院 数学综合报告会

报告题目: Phase-field tumour growth models: analysis, control and inverse reconstruction

报告人: Matteo Fornoni (University of Pavia)

报告时间: 2025 年 5 月 20 日星期二, 10: 00—11: 00

报告地点: 光华楼东主楼 1704 室

报告摘要: Mathematical models for tumour growth are becoming increasingly common in the recent scientific literature, as their main aim is the development of patient-specific models that can help clinicians' decisions through personalised tumour forecasts. Here, we consider models of phase-field type, mainly concerning young avascular tumours. Thus, we describe a tumour through a phase variable, representing the difference in volume fractions between cancerous cells and healthy cells in a given tissue. More specifically, our models are systems of PDEs of Cahn-Hilliard type, coupled to additional reaction-diffusion equations for other key quantities, such as nutrients used by the tumour cells to proliferate. During the talk, we will present some recent results and challenges in the mathematical analysis of such models. In particular, we will focus on the well-posedness of the PDE systems and the regularity of their solutions, as well as problems related to optimal control of therapies and inverse reconstruction of earlier states.

非线性数学模型与方法教育部重点实验室
中法应用数学国际联合实验室
上海市现代应用数学重点实验室
复旦大学数学研究所