

WEBINAR

Grupo de Análise Funcional e Aplicações Functional Analysis and Applications Group

Nonlinear cross-diffusion models and applications

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Abstract

After the pioneering work of Keller and Segel in the 1970s, cross-diffusion models became very popular in biology, chemistry, ecology, population dynamics, economy and physics to emulate systems with multiple species. Meanwhile, the underlying mathematical theory has been developed in a synergistic way with applications and, in recent years, this topic became the focus of an intensive research within the mathematics community. From a mathematical point of view, cross-diffusion models are described by time-dependent partial differential equations of diffusion or reaction-diffusion type, where the diffusive part involves a nonlinear non-diagonal diffusion matrix. This leads to a strongly coupled system where the evolution of each dependent variable depends on itself and on the others in a way governed by the diffusion matrix. Cross-diffusion terms are nowadays widely used in reaction-diffusion equations encountered in models from mathematical biology and in various engineering applications.

In this talk we review the basic model equations of such systems and give an overview of their mathematical analysis. We also consider the use of cross diffusion systems to model different phenomena in relevant applications, namely, image processing and the dynamics of crime behaviour.

Link: <https://videoconf-colibri.zoom.us/j/98796938753?pwd=a1EvdzJTbFNmMXdRTDE3V0M5TG5Gdz09>

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