



CENTRE DE RECERCA MATEMÀTICA

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Mathematical tools for analysing systems of Ordinary Differential

Abstract:

Systems of Ordinary Differential Equations (ODEs) are standard models of complex biological systems. Typically, these systems are high dimensional, have many unknown parameters and cannot be solved explicitly except in trivial cases.

In this talk I will discuss mathematical methods to analyze a system of ODEs with respect to properties of biological relevance - such as persistence (non-extinction), switching behavior and multistationarity - without having to fix parameters or perform numerical analysis. The methods draw on many areas of mathematics, such as graph theory, dynamical systems theory and algebraic geometry.

Biological applications often require surveying different mathematical models or proposing models with prescribed qualitative features that might be built experimentally. Simple analysis, ideally algorithmic, is therefore essential for usability. I will give examples of methods and applications to models of real biological systems, such as gene transcription and cell signaling. In many cases, the analysis reveals insight that might be interpreted biologically.

Date: Jul 14, 2017

Place: Room C1/028

Time: 12:00

