

CMM PDE Seminar

Speaker: David Poyato (University of Granada, Spain)

Title: Long-time behavior of a sexual reproduction model under the effect of strongly convex selection

Abstract: The Fisher infinitesimal model is a widely used statistical model in quantitative genetics that describes the propagation of a quantitative trait along generations of a population subjected to sexual reproduction. Recently, this model has pulled the attention of the mathematical community and some integro-differential equations have been proposed to study the precise dynamics of traits under the coupled effect of sexual reproduction and natural selection. Whilst some partial results have already been obtained, the complete understanding of the long-time behavior is essentially unknown when selection is not necessarily weak. In this talk, I will introduce a simplified time-discrete version inspired in the previous time-continuous models, and I will present two novel results on the long-time behavior of solutions to such a model. First, when selection has quadratic shape, we find quantitative convergence rates toward a unique equilibrium for generic initial data. Second, when selection is any strongly convex function, we recover similar convergence rates toward a locally-unique equilibrium for initial data sufficiently close to such an equilibrium. Our method of proof relies on a novel Caffarelli-type maximum principle for the Monge-Ampère equation, which provides a sharp contraction factor on a L^∞ version of the Fisher information. This is a joint work with Vincent Calvez, Filippo Santambrogio and Thomas Lepoutre.

Date: Tuesday, September 20, 2022 at 12 Santiago time

Modalidad: Presencial en sala de seminarios del CMM, piso 7, o bien online via zoom:

<https://uchile.zoom.us/j/97687856555?pwd=MkZYZWpEY0YwUTBHT3ROK29ob1JYdz09>

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