



Workshop on Stochastic Analysis

IMECC - Unicamp

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The logistic Keller-Segel equation and its particle approximation

Abstract

The Keller–Segel equation is a classical model for chemotaxis whose solutions may develop finite time blow up due to particle aggregation. I will review recent work of Cavallazzi, Richard and Tomašević (2025), who established global well-posedness of a logistic (birth-death) Keller–Segel equation together with a quantitative mean field limit for a branching system of moderately interacting particles. I will then discuss our ongoing work on the genuine singular particle system, where we show that critical particle collisions occur with arbitrarily small probability when the initial number of particles is sufficiently large. As a consequence, we obtain trajectorial tightness of the empirical measures. The talk is based on ongoing work with Alexandre Richard, Yoan Tardy and Milica Tomašević.