

Estimating the division rate in size-structured populations: merging deterministic and statistical approaches

Marie Doumic-Jauffret, INRIA-Paris-Rocquencourt

Size-structured PDE models have proved for many years to be an adequate tool for describing growth and division of biological populations of "individuals" such as cells, polymers etc.

In this talk, we address the issue of calibrating such models, i.e. of estimating the division rate of the population from the measure of its size distribution. The method proposed by Perthame and Zubelli in 2007 consists in considering the asymptotic size distribution rather than its time evolution: this radically simplifies the problem, and various regularization methods provide efficient ways of estimating the division rate. We will review some recent results, open problems and applications in this topic, and more specifically we will see how we can combine statistical and analytical approaches in order to select the regularization parameter (or bandwidth) and obtain optimal error bounds.