

Anna Marciniak-Czochra

INTERDISCIPLINARY CENTER FOR SCIENTIFIC COMPUTING,
INSTITUTE OF APPLIED MATHEMATICS AND BIOQUANT,
UNIVERSITY OF HEIDELBERG

e-mail: anna.marciniak@iwr.uni-heidelberg.de

Structured population models in metric spaces

Time evolution of a heterogeneous population parametrised by the dynamically regulated properties of individuals can be described by so called structured population models, which are first order hyperbolic equations defined on \mathbb{R}^+ .

In this talk a new framework for the analysis of measure-valued solutions of the nonlinear structured population model is presented. Existence and Lipschitz dependence of the solutions on the model parameters and initial data are shown using the properties of nonlinear semigroups in suitably chosen metric spaces. The estimates for a corresponding linear model are obtained based on the duality formula for transport equations. The results are discussed in the context of applications to biological data. In particular, the new framework is applied to describe a process of cell differentiation, which involves discrete and continuous transitions.

The presentation is based on joint works with Piotr Gwiazda (University of Warsaw) and Grzegorz Jamroz (University of Warsaw/University of Heidelberg).