

Global existence and large-time behaviour for reaction-diffusion models

Thursday, 16 June 2016 14:40 (45 minutes)

Systems of nonlinear reaction-diffusion equations are encountered frequently as models in chemistry, physics, populations dynamics and biology. However, due to the lack of comparison principles for general reaction-diffusion systems, already the existence of global weak/classical solutions poses many open problems, in particular in 3D.

In the absence of comparison principles, so called duality methods have recently proven to be one of the most powerful tools in obtaining global solutions for nonlinear reaction-diffusion systems.

The first part of this talk will present recent advances and results concerning the existence of global solutions via duality methods. The second part of the talk will then consider reaction-diffusion systems, which feature an entropy functional and discuss the convergence to equilibrium states with computable rates for large classes of such reaction-diffusion models.

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