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DK Seminar

Oct 19, 2016, 14:15 - 15:00
University of Vienna,
Oskar-Morgenstern-Platz 1, HS 2.

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Global existence analysis of cross-diffusion population systems for multiple species

The focus of this talk is on the existence of global-in-time weak solutions to reaction-cross-diffusion systems for an arbitrary number of competing population species. In the case of linear transition rates, the equations extend the two-species population model of Shigesada, Kawasaki, and Teramoto. The equations are considered in a bounded domain with homogeneous Neumann boundary conditions. The existence proof is based on a refined entropy method and a new approximation scheme. Global existence follows under a detailed balance or weak cross-diffusion condition. The detailed balance condition is related to the symmetry of the mobility matrix, which mirrors Onsager's principle in thermodynamics. Under detailed balance (and without reaction), the entropy is nonincreasing in time, but counter-examples show that the entropy may increase initially if detailed balance does not hold.