Oberseminar Analysis und Theoretische Physik

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A mathematical study of diffusive logistic equations in population dynamics

The purpose of this talk is to prove an existence and uniqueness theorem of positive solutions of diffusive logistic equations with indefinite weights that model population dynamics in environments with strong spatial heterogeneity. We prove that the most favorable situations will occur if there is a relatively large favorable region (with good resources and without crowding effects) located some distance away from the boundary of the environment. Moreover, we discuss the stability properties for positive steady states. A biological interpretation of main theorem is that an initial population will grow exponentially until limited by lack of available resources if the diffusion rate is below some critical value; this idea is generally credited to the English economist Thomas Robert Malthus. On the other hand, if the diffusion rate is above this critical value, then the model obeys the logistic equation introduced by the Belgian mathematical biologist Pierre François Verhulst.
The approach in this talk is distinguished by the extensive use of the ideas and techniques characteristic of the recent developments in partial differential equations.

Dienstag, 15.10.2019, 15:00 Uhr, Raum c311
Hauptgebäude der Leibniz Universität

Dazu laden herzlich ein:

Prof. Dr. Wolfram Bauer, Prof. Dr. Joachim Escher,
Prof. Dr. Elmar Schrohe, Prof. Dr. Christoph Walker