Research Report

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Publications

1. Chihiro Aida, Chao-Nien Chen, Kousuke Kuto, Hirokazu Ninomiya
   Bifurcation from infinity with applications to reaction-diffusion systems,
   Discrete and Continuous Dynamical Systems A, 40 (2020), 3031-3055.
   doi.org/10.3934/dcds.2020053

2. Shun Ito, Tomoya Tatsuno, Kousuke Kuto
   Construction of positive invariant sets in a prey-predator model with the Holling II type nonlinarity,
   Journal of the Japan Society for Industrial and Applied Mathematics, 30 (2020) 26-44 (in Jananese).
   doi.org/10.11540/jsiamt.30.1_26

3. Tatsuki Mori, Kousuke Kuto, Tohru Tsujikawa, Shoji Yotsutani
   Representation formulas of solutions and bifurcation sheets to a nonlocal Allen-Cahn equation,
   Discrete and Continuous Dynamical Systems A (in press).

Invited Talks

1. Mathematical analysis for the Lotka-Volterra system with cross-diffusion,
   Waseda University Mathematics / Applied Mathematical Colloquium,
   May 9, 2019,
   Waseda Univeristy

2. Bifurcation structure of steady-states to a prey-predator model with population flux by attractive transition,
   Applied Analysis Seminar,
   June 1, 2019,
   Waseda University

3. On a diffusive prey-predator model with population flux by attractive transition,
   PDE seminar,
   August 23, 2019,
   Capital Normal University, Beijing, China

4. On the structure of stationary solutions of the Shigesada-Kawasaki-Teramoto model,
   Workshop “Theory and Applications of Nonlinear Partial Differential Equations”,
   September 9, 2019,
   Hokkaido University, Sapporo, Japan

5. On an optimal distribution problem for stationary solutions of a diffusive logistic equations ～Introduction of results by Jumpei Inoue (UEC, M2)～
   Chofu Analysis Seminar,
   September 21, 2019,
   The University of Electro-Communications, Tokyo, Japan

6. Stability analysis for coexistence steady-states in the Shigesada-Kawasaki-Teramoto model,
   Workshop “New Development of Evolutionary Equation Theory: Collaboration between Mathematical Theory and Phenomena Analysis“
   October 9, 2019,
   Research Institute of Mathematical Sciences, Kyoto University, Kyoto, Japan

7. Bifurcation structure of coexistence steady-states to the SKT model with large cross-diffusion,
   Tohoku University Mathematics Colloquium,
   November 25, 2019,
   Kawai Hall, Tohoku University, Sendai, Japan

8. On an optimal distribution problem and the existence of L^1 unbounded sequence of stationary solutions for a diffusive logistic equation,
   Oita Analysis Seminar,
   December 7, 2019,
   Satellite Campus Oita, Oita, Japan

9. On the unboundedness of the integral ratio of stationary solutions and resources in a diffusive logistic equation,
   Workshop on Analysis in Kagurazaka 2020,
   January 24, 2019,
   Tokyo University of Sciences, Tokyo, Japan

Research Summary

1. I studied the global structure of stationary solutions of the Lotka-Volterra system with cross-diffusion terms. Among other things, I proved the uniform boundedness of all stationary solutions and derived limiting systems that characterize the asymptotic behavior of solutions as both cross-diffusion coefficients tend to infinity.

2. We studied the profile of stationary solutions of a diffusive logistic equation. Among other things, a joint research with Jumpei Inoue showed the unboundedness of the L^1 ratio of species and resources varying diffusion coefficients and profiles of resource functions in the case when the habitat is a multi-dimensional ball.