



Meiji University Global COE Program 55th Mathematical Sciences based on



Modeling, Analysis and Simulation seminar

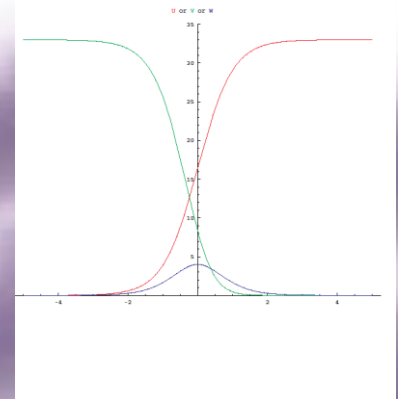
Date: July 26, 2012, 16:30~18:00

Location: Meiji Univ. Ikuta Campus, Build 2 Annex A, Room A401.

Li-Chang Hung (Meiji University)

Title : Traveling Wave Solutions of Competitive Lotka-Volterra Systems : Constructing Solutions for a System of PDEs from Solutions for a Single PDE

Abstract : In theoretical ecology, a frequently-used model to describe the competition among n distinct species is the competitive Lotka-Volterra system of n species with diffusion. From the viewpoint of ecology, determining which species will survive in a competitive system is of fundamental importance. In order to study this problem, we can use traveling wave solutions. In this talk, we investigate the existence of traveling wave solutions for Lotka-Volterra systems of n competing species. For the case $n=2$, we show that new exact traveling wave solutions exist by introducing appropriate ansätze. In addition, some open problems and conjectures related to the 2-species case are presented. The case $n=3$ is more complicated and contains rich and interesting phenomenon to be explored. Motivated by the results of exact solutions for $n=2$, exact traveling wave solutions of the 3 species case are found. Based on these exact solutions, AUTO is used to obtain the global branch of non-trivial traveling wave solutions when some parameter is varied. Semi-exact traveling wave solutions are also found for the case $n=3$. In particular, it is notable that many elementary but tedious computations when finding exact solutions are done by Mathematica.



Everyone is welcome to attend the MAS seminar.

Meiji institute for Advanced Study of Mathematical Science (<http://www.mims.meiji.ac.jp>)
(Organizers: M. Mimura, D. Ueyama, Y. Wakano, K. Ikeda and S.Kinoshita)

MAS seminar is partly supported by Meiji University Global COE program “Formation and Development of Mathematical Sciences Based on Modeling and Analysis” (<http://goe.mims.meiji.ac.jp/>), the Grant-in-Aid for Scientific Research (S), “Mathematical Theory of Nonlinear-Non-equilibrium Reaction-Diffusion Systems” by M. Mimura (<http://nnrds.math.meiji.ac.jp/>).



Access: 10 minutes on foot from Ikuta St. Odakyu line,
Or 10 minutes by bus No. 13「明治大学正門前」, get off at the last stop.
See http://www.meiji.ac.jp/koho/campus_guide/ for details.