Mini-Workshop on chemotaxis systems and related problems

This mini-workshop will be held on Jan. 16, 2021 in campus of Shanghai Jiao Tong University and supported by the NSFC-DFG project "Emergence of structures and advantages in cross-diffusion systems". The purpose of this workshop is to exchange ideas and recent results in the study of chemotaxis models and free boundary problems for reaction-diffusion equations between several domestic researchers, and to cultivate possible new research topics or cooperations.

Organizers:

Bendong Lou, Shanghai Normal University
Youshan Tao, Shanghai Jiao Tong University

Venues:

Room 901, No. 6 Building, Science Buildings
Minhang Campus Shanghai Jiao Tong University
800 Dongchuan Road

Hotel:

Huhua International Hotel
368 Jianchuan Road
Tel: 021-31200354

Schedule:

Chair: Youshan Tao (陶有山)
 9:40-10:20   Speaker: Chunlai Mu （穆春来）   (Chongqing University)
10:20-11:00   Speaker: Yuxiang Li （李玉祥）   (Southeast University)

11:00-11:10   Tea break

Chair: Bendong Lou（娄本东）
11:10-11:50   Speaker: Zhigui Lin   （林支桂） (Yangzhou University)

12:20-13:30   Lunch
14:00-17:30   Free discussion
18:00   Dinner

The finite-time blow-up in a flux-limited chemotaxis model with nonlinear signal production

Chunlai Mu

Chongqing University

Abstract: This talk addresses an initial-boundary value problem for a flux-limited parabolic-elliptic chemotaxis model with superlinear signal production in radially symmetric setting in high dimensions. Under appropriate assumptions on the model parameters, finite-time blow-up solutions are constructed.

Recent advances in chemotaxis fluid systems

Li Yuxiang

Southeast University

Abstract: In this talk, I first review the results of chemotaxis-Navior-Stokes system. Then I concentrate on an incompressible chemotaxis-Navier-Stokes system with p-Laplacian diffusion under homogeneous boundary conditions of Neumann type for density of bacteria and concentration of nutrient, and of Dirichlet type for fluid in a bounded convex domain with smooth boundary in $\mathbb{R}^3$. First we prove that if p>32/15 and under appropriate structural assumptions on parameters, for all sufficiently smooth initial data, the model possesses at least one global weak solution. Then we prove that for the incompressible chemotaxis-Stokes system, the global weak solution is bounded whenever p>25/12.

周期演化区域、自由变化区域和斑块上的扩散

林支桂

扬州大学

摘要：区域的演化分为两种：已知的和未知的. 前者通常是环境引起，后者是种群自身发展的要求. 首先考虑周期演化区域上的 Logistic 种群扩散问题，给出基本再生数，得到演化率对种群扩散的影响；再研究自由变化区域上的 Logistic 种群扩散问题，给出扩张-灭绝二择一结果和扩张时的渐近速度；然后介绍自由变化区域上的 SIS 传染病模型，给出时空风险指标；最后介绍描述新冠病毒的斑块模型，利用有向图上的扩散刻画国家四级应急防控的成效.