



西北大学  
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## Global dynamics on a Predator-prey Model in Open Advective Environments

**报告人:** 聂华 教授 (陕西师范大学)

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**链接入会:** <https://meeting.tencent.com/s/i1QpKLPvzvK>

### 报告摘要:

We investigate a reaction-diffusion-advection system which characterizes the interactions between the predator and prey in advective environments, such as streams or rivers. In contrast with non-advective environments, the dynamics of this system is more complicated. It turns out that there exists a critical mortality rate of the predator and two critical advection rates, which classify the dynamic behavior of this system into two or three scenarios, that is, (i) both populations go extinct; (ii) the predator can not invade and the prey survives in the long run; (iii) the predator can invade successfully when rare and it will coexist permanently with the prey. Specially, the predator can invade successfully when rare if both the mortality rate of the predator and the advection rate are suitably small. Furthermore, by the global bifurcation theory and some auxiliary techniques, the existence and uniqueness of coexistence steady states of this system are established. Finally, by means of numerical simulations, the effects of diffusion on the dynamics of this system are investigated. The numerical results show that the random dispersals of both populations favor the invasion of the predator.

### 报告人简介:

聂华, 教授、博士生导师, 研究方向: 反应扩散方程与空间生态种群模型。现任中国生物数学学会理事、中国计算数学学会理事。2006年获得博士学位, 2012年入选教育部“新世纪优秀人才支持计划”; 2015年入选陕西省“青年科技新星”; 多次赴美国明尼苏达大学、澳大利亚新英格兰大学、台湾清华大学合作研究与访问。已主持国家自然科学基金项目4项, 主持完成省部级项目3项; 已在“SIAM J. Appl. Math.”、“SIAM J. Math. Anal.”、“J. Differential Equations”、“J. Math. Biol.”、“Math. Biosci.”、“European J. Appl. Math.”、“Proc. London Math. Soc.”、“Sci. China Math.”等国内外知名刊物上发表学术论文50多篇。

欢迎各位老师和同学参加!

西北大学数学学院

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