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## 张志涛研究员和他的博士生王克磊在自由边界问题和多物种生物竞争方程组方面取得重要进展

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(2009-12-4) 数学所张志涛研究员和他的博士生王克磊在自由边界问题和多物种生物竞争方程组方面取得重要进展。他们研究了多物种 Lotka-Volterra 竞争模型及竞争系数趋向无穷时的相应的奇异极限方程组的解。这个困难问题在最近几年受到很大的关注,吸引了包括 Caffarelli、Fanghua Lin、E.N.Dancer 和 S. Terracini 等许多著名数学家的研究。

在这篇论文中,他们证明了方程组解的存在性、唯一性、相应抛物问题中时间趋向正无穷时解的稳定性以及一致 Lipschitz 估计等结果。他们也奇异极限方程组中的自由边界的测度给出了估计,并且彻底证明了之前由 S. Terracini 等人部分证明的一个猜想结果:该奇异极限方程组的解具有最小能量,是到一个具有非正曲率的度量空间的调和映射。

评审意见认为:

“..... The problem is very interesting and has attracted a lot of attention in the last years.”

“.....The uniqueness part is fully new, also obtained through a comparison principle.....”

“.....gives a substantial improvement... On the other hand, the proof here is much simpler and provides directly the Lipschitz continuity of the limiting configurations”

“The last part... is devoted to a deep analysis of the properties of the limiting profiles... ,It was conjectured and partially proved in [10] that such minimal energy configuration should exhaust all solutions of the system of inequality. This is indeed proved in the present paper (Theorem 1.6)”

“.....this is a remarkable paper, with many new ideas. It is also clearly written and easy to read. I strongly recommend it for publication... ..”

题目: Some New Results in Competing Systems with Many Species

作者: Kelei Wang, Zhitao Zhang

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