Acta Mathematicae Applicatae Sinica (Chinese Series)

ISSN 0254-3079
CN 11-2040/O1

应用数学学报 英文版

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带移民和拯救的碰撞分枝过程的性质

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The Properties of Interacting Branching Collision Processes with Immigration and Resurrection

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- 摘要
- 参考文献
- 相关文章

全文: PDF (374 KB)   HTML (1 KB)   输出: BibTeX | EndNote (RIS)   背景资料

摘要 本文考虑一类带移民和拯救的碰撞分枝过程(BCPIR)的存在唯一性、常返性以及临界爆炸情形下的衰减性质. 首先深入讨论了BCIR q-矩阵发生函数的性质, 建立了过程的唯一性判别准则, 得到了一些比较好的过程常返性充分条件; 并且通过发生函数给出了临界爆炸情形下关于连通类Z_+的衰减指数λ_Z的精确值.同时, 进一步讨论λ_Z-不变测度/不变向量, 给出了λ_Z-不变测度的发生函数.

关键词: 碰撞分枝过程　常返性　衰减指数　不变测度　不变向量

Abstract： In this paper, we consider the uniqueness, recurrence and decay properties of the Interacting Branching Collision Processes with Immigration and Resurrection (BCP- IR). Some important properties of the generating functions for BC-IR q-matrix are firstly investigated in detail. It is proved that there exists a unique BCP-IR, and a good sufficient conditions for it to be recurrent is given. Moreover, the exact value of the decay parameter λ_Z is obtained in the critical explosion case. It is shown that this λ_Z can be directly given from the generating functions of the corresponding q-matrix. Finally, the λ_Z-invariant vectors/measures are presented.

Key words: collision branching process　recurrence　decay parameter　invariant measures　invariant vectors

引用本文:

王娟,李俊平. 带移民和拯救的碰撞分枝过程的性质[J]. 应用数学学报, 2013, (1): 23-37.

WANG Juan,LI Junping. The Properties of Interacting Branching Collision Processes with Immigration and Resurrection[J]. Acta Mathematicae Applicatae Sinica, 2013, (1): 23-37.

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