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论文

具有年龄结构的线性周期种群动力系统的最优收获控制问题

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摘要：

研究一类具有年龄结构的线性周期种群动力系统的最优收获控制问题,即讨论了具有周期的生死率和周期变化的收获项的Lotka Mckendrick模型.利用Mazur's定理,作者证明了控制问题最优解的存在性,同时借助于法锥概念,还得到了控制问题最优解存在的必要条件。最后，在适当的假设下，得到了最优控制问题的唯一解。该文的结论推广了某些已有的结果.

关键词： 最优收获;最优控制;周期种群动力学;最大值原理

分类号:

35B10;49J20;65L12

Optimal Harvesting Control Problem for Linear Periodic Age dependent Population Dynamic System

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Abstract:

In this paper, an optimal harvesting problem for linear periodic age\|dependent population dynamics is investigated. Namely, the Lotka\|Mckendrick model with periodic vital rates and a periodic forcing term that sustains oscillations is considered. By Mazur's theorem, existence of solutions of the optimal control problem is demonstrated and by the conception of normal cone, first order necessary conditions of optimality for the problem are
obtained. Finally, under suitable assumptions, uniqueness of solution of the optimal control problem is given. The results extend some known criteria.

Keywords: Optimal harvesting Optimal control Periodic popu lation dynamics The maximum principle

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