n维可投影 Lotka-Volterra竞争系统的渐近性

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摘要　　对于二维和三维的Lotka-olterra 竞争系统, 已有文献证明: 当每一个坐标轴上的平衡点均为渐近稳定时, 该系统几乎所有解趋于坐标轴上平衡点所组成的点集, 即, 不趋于坐标轴上平衡点的解集, 其测度为零. 由此, van den Driessche 和 Zeeman 于1998年提出猜测: 对 $n (n>3)$维Lotka-Volterra 竞争系统, 当每一个坐标轴上的平衡点均为渐近稳定时, 该系统几乎所有解趋于坐标轴上平衡点所组成的点集, 即, 不趋于坐标轴上平衡点的解集, 其在 n 维空间的测度为零. 本文证明当 n 维Lotka-Volterra 竞争系统可被逐维投影到一维系统时, 该猜测成立, 并给出了可投影条件的代数判据. 本文所得结论包含了已有文献的结果.

关键词　　Lotka-Volterra　渐近稳定　径向投影　测度

分类号

ASYMPTOTIC BEHAVIOR OF n DIMENSIONAL COMPETITIVE LOTKA-VOLTERRA SYSTEMS WHICH CAN BE RADIALLY PROJECTED

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Abstract For two species and three species competitive Lotka-Volterra systems, it is known that as axial fixed points are asymptotically stable, almost all the orbits tend to the axial fixed points. That is, the measure of solutions that do not tend to the axial fixed points, is equal to aero. Motivated from this result, van den Driessche and Zeeman raised a conjecture in 1998: for n(n > 3) species competitive Lotka-Volterra systems, almost all the orbits tend to axial fixed points as the axial fixed points are asymptotieally stable．That is ,in n dimensional space，the measure of solutions that do not eonverge to the axial fixed points，is equal to aero .In this paper，we prove the conjecture under the condition that the of n dimensional competitive Lotka-Volterra systems can be projected to one dimensional Lotka-Volterra systems.we give the algebraic criteria under which the systems can be projected and our result includes those in previous works.

Key words　　Lotka-Volterra　asymptotically stable　radial projection　measure

通讯作者