MULTISTABILITY IN THE ROCK-PAPER-SCISSORS GAME

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In this talk, we consider the rock-paper-scissors game with intraspecific competition by applying the density dependence which is common in ecosystems. As a way to describe the density dependence, we assume that intraspecific competition may depend on the logistic growth of each species group, and explore how it can affect biodiversity in the existing society of three species. As a result, from macroscopically and microscopic approaches, we found that the system becomes multistable, involving fundamental phenomena at the same time such as an asymptotically stable heteroclinic cycle and a stable attractor. When the system is multistable, the survival state is determined by initial densities of three species. Further, we also found theoretically that the multistability is associated with a subcritical Hopf bifurcation.

REFERENCES


This work was supported by the National Research Foundation of Korea(NRF) grant funded by the Korea government(MSIP) (email: jppark@unist.ac.kr).