BIG BANG BIFURCATIONS AND ALLEE'S DYNAMICS IN GENERIC POPULATION SIZE FUNCTIONS

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The main purpose of this talk is to present dynamics and bifurcations properties of the generic growth functions, which are defined by the population size functions of the generic growth equation. This family of unimodal maps naturally incorporates a principal focus of ecological and biological research: the Allee effect. The analysis of this kind of extinction phenomenon allow to identify a class of Allee's functions and characterize the corresponding Allee's effect region and Allee's bifurcation curve. The bifurcation analysis is founded on the performance of fold and flip bifurcations. The dynamical behavior is rich with abundant complex bifurcation structures, standing out the big bang bifurcations of the so-called "box-within-a-box" fractal type. Moreover, these bifurcation cascades converge to different big bang bifurcation curves with distinct kinds of boxes, where for the corresponding parameter values several attractors are associated. Analytical results will be illustrated with numerical simulations and appropriate bifurcation diagrams. To the best of our knowledge, these results represent an original contribution to clarify the big bang bifurcation analysis of continuous 1D maps.

References

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