

Injectivity and Global Stability of Discrete Dynamical Systems

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It is an important problem in discrete dynamics to determine when local stability of fixed points implies global stability. This can be naturally framed as a question of injectivity. Using the planar Ricker competition model as our main model, we introduce ideas from singularity theory to describe the dynamics of the images of the critical curves to show global stability. We then revisit the notion of monotonicity of planar maps and develop a geometric generalization for maps in higher dimensions. Using global injectivity results, we expand this work for periodic maps.

In Special Session 8 on Global Injectivity, Jacobian Conjecture and Related Topics at the Mathematical Congress of the Americas 2025.