Spatiotemporal Chaos in a Chemically Realistic Model: Dynamics, Competitive Chaotic Populations and Transient Behavior

K. Showalter

West Virginia University, Department of Chemistry
P.O. Box 6045.Morgantown, WV 26506-6045, U.S.A.

Spatiotemporal chaos in a two-variable, cubic-autocatalysis model with equal diffusivities of the species is described. The interplay between an unstable homogeneous state and propagating fronts that return the system to that state gives rise to a reinjection mechanism for chaotic behavior. The behavior of species competing for a common resource is studied in three-and four-variable models. We find that populations self-segregate to form a complex network of domains separated by distinct interfaces. The nature of transient chaos is examined in the context of this and the Baer-Eiswirth model.

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