

Dynamics of acyclic 1-dimensional maps

Morris W. Hirsch,
Honorary Fellow, University of Wisconsin

He who can digest a second or third fluxion . . . need not, methinks, be squeamish about any point in divinity. —Bishop George Berkeley, “The Analyst” (1734)

A continuous map f in an interval is *acyclic* if only fixed points are periodic. By Sarkovski’s theorem this is equivalent to every point of period 2 being fixed, and it implies that any orbit is either discrete or convergent. A typical but nontrivial example, used as a model of population dynamics, is xe^{b-x} for $x \geq 0$, where $0 \leq b \leq 2$. Old and new conditions for acyclicity will be discussed, some of which involve f''' and the Schwarzian derivative. The talk will be accessible to all; no special knowledge of dynamics is assumed.