Spatiotemporal Chaos in Traveling Waves of Lattice Dynamical Systems

A. M. Penaso
Central Mindanao University, Bukidnon, Philippines

In this paper, we describe *coupled map lattices* (*CMLs*) as discretizations to some well-known partial differential equations. We then describe spatiotemporal chaos associated with the set of traveling wave solutions of CMLs as well as the dynamics of the evolution operator on this set. Moreover, we determine some hyperbolic, topological, and ergodic properties of the traveling wave map and consider some interesting examples.

Collaborators: Ya. B. Pesin, *The Pennsylvania State University, University Park,USA*, & G. L. Calio, *MSU-Iligan Institute of Technology, Philippines*

References:

1. V. Afraimovich & Ya. B. Pesin. Traveling waves in lattice models of multi-dimensional and multi-component media: Part I. General hyperbolic properties, *Nonlinearity, 6* (1993) 429-455.
2. V. Afraimovich, Ya. B. Pesin, & A. Tempelman. Traveling waves in lattice models of multi-dimensional and multi-component media: Part II. Ergodic properties and dimension, *Chaos 3* (1993) 233-2412.
3. M. Jiang & Ya. B. Pesin. Equilibrium measures fror coupled map lattices: existence, uniqueness, and finite-dimensional approximations, *Comm. Math. Phys.*, 193:3 (1998) 675-711.
4. D. R. Orendovici & Ya. B. Pesin. Chaos in traveling waves of lattice dynamical systems, *Proceedings of the IMA Volumes in Mathematics and its Applications*, v. 119, Numerical Methods for Bifurcation Problems and Large-scale Dynamical Systems, Springer-Verlag (1999) 327-359.
5. Ya. B. Pesin & Ya. Sinai. Space-time chaos in the system of weakly interacting hyperbolic systems, *Journal of Geometry and* Physics, 5:3 (1988) 483-492.