

Real-valued nonlinear recursive dynamical system with a probabilistic perturbation

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We are interested in a dynamical system satisfying a non-linear, partly deterministic recurrence relation of order k , with a stochastic noise term:

$$X_{t+k} = \Phi_0(X_t, \dots, X_{t+k-1}) + \varepsilon_t$$

We give sufficient conditions on Φ_0 ensuring that our system admits an ACIM (absolutely continuous invariant measure). To that end, we associate a transform on \mathbb{R}^k with our system, and show that the associated transfer operator satisfies a Lasota-Yorke inequality.