

# Uniform attractors of nonautonomous dynamical systems with memory

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The study of nonlinear dynamical systems is of basic importance in the understanding of several natural phenomena. If a certain mathematical model is described by a nonlinear dynamical system, then it is usually difficult to predict whether or not the system will evolve towards a stationary state or it will exhibit a chaotic behavior. The sensibility to the initial conditions and to the parameters characterizing the nonlinear system show that a correct approach to study its dynamics should be more geometric. This means that the evolution system must be treated as an ordinary differential equation whose solutions (trajectories) can be viewed as curves in a suitable phase space, possibly of infinite dimension. We recall, for instance, that the chaotic behavior of some nonlinear system can be explained by the existence of a so-called *strange attractor*; that is, a set, usually of finite fractal dimension, which *attracts uniformly* any trajectory. Actually, this means that in the long run the dynamics of an infinite dimensional system is controlled by a finite number of parameters and this can be of some help for possible numerical approximations.