

Deterministic chaos and predictability and computational issues

Abstract

We review the basic mathematical aspects of dynamical systems and their qualitative and statistical analysis, which lie at the foundations of the theory of deterministic chaos. In particular, we will investigate the notions of chaos and its indicators, symbolic dynamics, bifurcations and invariant probability measures. The theory of chaos has countless applications, ranging from the hard physical sciences (turbulence, response theory, weather and climate predictability, population dynamics etc.) to the soft modern sociological sciences. We will review some of the issues of physical and technological interest which require intensive numerical investigations.