

Predictability of chaotic dynamics in the presence of fluctuations versus structure of chaotic attractors

The ability to predict behaviour and/or transitions in complex system is an important problem that appears in enormous number of applications. Especially such prediction is important in the context of the so-called “early-warning signals for critical transitions” [1]. Situations when chaos and stochastic perturbations govern the dynamics remain practically unexplored.

The aim of mini-project is to investigate the influence of structure of chaotic attractor on prediction of trajectory dynamics (the so-called prediction horizon) in the presence of stochastic perturbations. Different types of attractors: hyperbolic, quasi-hyperbolic, non-hyperbolic and wild-chaotic attractor will be analysed.

The further development of the topic consists in the developing nonlinear prediction techniques for prediction of dynamics and bifurcations in chaotic systems, including the early-warning signals of coming transitions.

References

1. M. Scheffer et al, Nature, **461**, 53 (2009).