Applied Chaos: Quantifying Complex Systems

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Abstract

This contribution discusses dynamic reconstructions and their application to the identification of, quantification of and discrimination between complex systems. Phase space reconstructions which reproduce the flow of dynamical systems in time are constructed from (multiple probe) time series data. These dynamic reconstructions are used to quantify the unknown system. In the case of chaotic systems, this is accomplished through the isolation of unstable periodic orbits. The method is applied to data from the Ikeda map, where it is shown that the data requirements of this approach are modest relative to those required for other types of analysis. The application of this approach to systems where the underlying dynamics are stochastic is also discussed.

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