

On Chaotic Analysis of A Waste Water Flow

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Chaos is a complex and irregular world in contrast with simple and regular natures of linear systems. Scientists and engineers have invoked low-dimensional chaos for understanding the nature of real systems. In this study, the complex behavior of a daily wastewater flow and evidence of deterministic nonlinear dynamics are investigated. The analysis involves both a metric approach of the correlation dimension and a topological technique called the close returns plot. The estimation procedure of delay time and delay time window is reviewed using a new technique called the C-C method for the state space reconstruction. And both parameters are used for estimating the correlation dimension. As a result, the daily wastewater flow shows no evidence of chaotic dynamics, which implies that stochastic models rather than deterministic chaos may be more appropriate for representing an investigated series.

Keywords: Chaos; water treatment; embedding; BDS statistic; correlation dimension; close returns.

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