Improvement in global forecast for chaotic time series

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Abstract

In the Polynomial Global Approach to Time Series Analysis, the most costly (computationally speaking) step is the finding of the fitting polynomial. Here we present two routines that improve the forecasting. In the first, an algorithm that greatly improves this situation is introduced and implemented. The heart of this procedure is implemented on the specific routine which performs a mapping with great efficiency. In comparison with the similar procedure of the `TimeS` package developed by Carli, Duarte and da Mota (2014), an enormous gain in efficiency and an increasing in accuracy are obtained. Another development in this work is the establishment of a level of confidence in global prediction with a statistical test for evaluating if the minimization performed is suitable or not. The other program presented in this article applies the Shapiro-Wilk test for checking the normality of the distribution of errors and calculates the expected deviation. The development is employed in observed and simulated time series to illustrate the performance obtained.

Keywords: Time Series Analysis; Global Fitting; Predictability; Chaos; Symbolic Computation.

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