

工程与应用

## 非线性动力系统R/S法的改进及小波预测

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**摘要** 针对固定电话和移动电话用户人数的时间序列, 将小波变换与R/S分析法, 多重分形相结合, 探讨了系统的动力学特性和演化规律, 并从分形维数、非周期循环长度、奇异性指数等方面指出电话用户人数增长趋势存在强持续性和长期记忆性以及具有多重分形特征, 随着配分阶数的增大, 多重分形随之增强, 并得出移动电话人数的多重分形特性更强。接着对原始数据和小波重构后的数据进行了回归拟合比较, 结果证明小波重构后的数据拟合程度更高, 并利用重构的数据预测了未来三个月的电话用户人数。

**关键词** [电话用户人数](#) [R/S分析](#) [非周期循环长度](#) [多重分形分析](#) [小波变换](#) [预测](#)

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## Improvement of R/S analysis in nonlinear system and wavelet forecast

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### Abstract

By reconstructing the original data by wavelet transform based on R/S analysis and multifractal analysis, it analyses the nonlinear characteristics of the system of fixed-line phone users and mobile phone users and its evolutionary principle. According to fractal dimension, non-periodic cycle, holder index, it points out that the growth of phone users has strong stability, long-term memory and multifractal feature. With the order of partition function increasing, the multifractal strength increases. Moreover, the multifractal strength of mobile phone users is greater. Compared to the original data, the reconstructed data fit better. The number of phone users of the next three months is forecasted by the reconstructed data.

**Key words** [the number of phone users](#) [Rescaled Range Analysis \(R/S\)](#) [non-periodic cycle](#) [multifractal analysis](#) [wavelet transform](#) [forecast](#)

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