

论文

S波段雷达实测海杂波混沌分形特性分析

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收稿日期 2005-11-16 修回日期 2006-5-22 网络版发布日期 2008-1-29 接受日期

摘要

S波段海杂波信号表现了非线性和频谱时变性, 传统的谱分析方法, 无法反映该信号在时间上的演化规律。该文首先引入分形布朗运动模型, 基于S波段雷达实测海杂波数据, 计算了该分形模型的海杂波Hurst指数, 进而求得了其分形维数。然后利用经典的Rosenstein方法, 计算了S波段实测海杂波的最大Lyapunov指数, 从而证实了S波段雷达海洋回波信号具有混沌分形特性。最后进行了计算机实验, 验证了本文的结论。该文的工作为S波段海洋雷达的目标探测提供了一种新的途径。

关键词 [S波段雷达](#) [实测海杂波数据](#) [混沌](#) [分形布朗运动](#) [分形维数](#)

分类号 [TN959.72](#)

The Analysis of Chaos and Fractal Characteristic Based on The Observed Sea Clutter of S-Band Radar

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Abstract

The sea clutter of S-band radar shows nonlinearities and time variation of its spectrum. However, the spectrum analysis method cannot reflect the evolution of the sea clutter of S-band radar in time domain. Adopting the model of Fractional Brownian Motion (FBM), this paper deduces Hurst exponent for the first time based on the observed data. Furthermore, the fractal dimension of the S-band sea clutter is also deduced. Then the largest Lyapunov exponent is obtained by Rosenstein method, which proves its chaos and fractal characteristic. Finally, the computer simulation is processed and the results prove the validity and veracity of the conclusion proposed in this paper. This conclusion provides a new approach for target detection with the S-band sea radar.

Key words [S-band radar](#) [Observed sea clutter](#) [Chaos](#) [Fractal Brownian Motion \(FBM\)](#) [Fractal dimension](#)

DOI:

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