

论文

变尺度混沌粒子群与小波的地基沉降预测应用

吴瑞海 董吉文 段琪庆

1. 济南大学信息科学与工程学院, 山东 济南 250022; 2. 济南大学土木建筑学院, 山东 济南 250002

摘要:

针对粒子群算法易出现早熟,搜索精度低的问题,从惯性权重的确定和算法搜索精度两个方面进行了改进。其中惯性权重由随迭代次数非线性递减函数和一随机扰动项确定,利用这个扰动项的突变性来跳出极小值区域,同时为增加粒子的多样性,提高算法搜索精度,引入了变尺度混沌搜索,并将该方法和标准粒子群算法分别与小波去噪结合,预测地基累计沉降量并做了对比,实验表明本文方法具有良好的全局和局部搜索能力,预测精度高。

关键词: 小波分析;粒子群优化算法;地基沉降;预测

A scale chaos particle swarm optimization algorithm and the wavelet in the forecast application of foundation settlement

吴瑞海 董吉文 段琪庆

1. School of Information Science and Engineering, University of Jinan, Jinan 250022, Shandong, China;
2. School of Civil Engineering and Architecture, University of Jinan Jinan 250002, Shandong, China

Abstract:

Contrary to the problem of premature and low searching precision which the particle swarm optimization (PSO) has, this paper improved it from two aspects: the method of fixing inertia weight and the method of improving the algorithm's searching precision. The inertia weight was determined by a function whose value was decreased nonlinearly and a stochastic value. The stochastic value randomness to jump out the local optima is used. In order to improve the particle's diversity and the algorithm's ability of searching global optima, the scale chaos searching was introduced. Also we made a comparison with the standard particle swarm optimization (SPSO) with wavelet to forecast foundation settlement. The experiment indicated that the method had strong global and local searching optima and high forecast precision.

Keywords: wavelet analysis; particle swarm optimization; foundation settlement; prediction

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