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论文

最新目录 | 下期目录 | 过刊浏览 | 高级检索

◀ 前一篇 | 后一篇 ▶

## 基于直接估计法的NGM(1,1)模型拓展

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## Expand of NGM(1,1) model based on the direct estimation method

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摘要

图/表

参考文献(19)

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## 摘要

从近似非齐次指数序列的GM(1,1)模型时间响应函数出发, 推导累加序列间的函数递推关系, 并给出求解时间响应函数参数值的直接估计方法. 在此基础上, 构建一种能同时模拟近似齐次和近似非齐次指数序列的新NGM(1,1)模型, 该模型避免了模型参数估计从差分方程到微分方程的跳跃性误差, 并从理论上解释了新模型能模拟齐次指数序列和非齐次指数序列的原因. 通过对新NGM(1,1)模型与既有模型进行比较, 表明了所提出模型具有更优良的模拟和预测性能.

**关键词**: 灰色系统, 灰色预测模型, 直接估计法, 近似非齐次指数增长序列

## Abstract:

The recursive relationship of the accumulative sequence is deduced according to the original sequence of non-homogeneous exponential of time response function of GM(1,1) model, and the direct estimation method is constructed to solve the parameters values of the time response function. Then, an NGM(1,1) model which can simulate approximate homogenous exponential sequence and approximate non-homogenous exponential sequence is proposed. This NGM(1,1) model avoids the jumping error of the model parameters estimation from difference equation to differential equation, and explains theoretically the reason for its capability of simulating the homogenous and non-homogenous exponential sequence. The results show that the simulation and prediction of the proposed model is more excellent through the comparison of the new NGM(1,1) and the existing models.

**Key words**: grey theory prediction model direct estimation method approximate non-homogenous exponential sequence

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