URN etd-0407109-183719-1596
Author Wei-Jung Lo
Author's Email Address No Public.
Statistics This thesis had been viewed 45 times. Download 0 times.
Department
Year 2007
Semester 2
Degree Master
Type of Document Master's Thesis
Language zh-TW.Big5 Chinese
Title Study on the Background Value and Residual Modification Methods of Grey Prediction GM(1,1) Model
Date of Defense 0000-00-00
Page Count 84

Keyword
TRGM(1,1)Model
MRGM(1,1)Model
FRGM(1,1)Model
RGM(1,1)Model
Background Value
Residual Modification
GM(1,1)Model

Abstract
The grey prediction GM(1,1) model takes discrete and irregular data to establish an effective prediction model through accumulated generating operation(AGO) and simple modeling. But the background value of GM(1,1) model Z(1)(k) is composed of the average background value of two discrete points, which cannot fit the discrete data suitably at times. Therefore, many scholars propose background values with different patterns to improve the predictive ability of the traditional GM(1,1) model in recent years. Moreover, some scholars establish GM(1,1) model with diverse residual modification to enhance the accuracy of the grey prediction model. However, few researches emphasize on merits and demerits and application conditions of GM(1,1) models with different background value and residual modification at present. On the other hand, in order to provide correct modeling information for the follow-up researches, partial scholars' concepts are not very reasonable and needed to be unraveled when they establish residual modification GM(1,1) model. Based on the above research background, the research has two main purposes: (1)collecting relative documents of the background value and the residual modification of GM(1,1) model, and using the literatures review method to compare and analyze the merits, demerits, and application conditions of all kinds of models; (2)finding and improving demerits and mistakes of past relative researches. The result of this research may provide information for follow-up related researches to choose correct grey prediction model, enhancing the accuracy of prediction and besteading the correctness of policy-making.
According to the result of the analysis, the main conclusions of this thesis are as follows:
(1)As for GM(1,1) model, different forms of background value of the model have different development coefficient a, and will affect the accuracy of the prediction of GM(1,1) model. GM(1,1) model adopts the background value of average generating, and only can be applied as sequence data has little change (i.e. |a| tend to 0). Moreover, if the sequence data is pure index series, the approximate background value advanced by Zhao et al. (2007) is applied as sequence data has little change (i.e. development coefficient a>-1), but its predictive ability is not absolutely better than GM(1,1) model. GM (1,1|α) model adopts the interpolation generating of background value which

can be applied no matter the sequence data changes smaller (i.e. smaller |α|) or larger (i.e. larger |α|) when the sequence data is pure index series, and the development coefficient a must be limited by the tolerant zone . When sequence data is pure index series, the background value advanced by Lin and Liu (2006) can be applied no matter the sequence data changes smaller (i.e. smaller |α|) or larger (i.e. larger |α|), and the development coefficient α has no limitation.
(2)Different residual modification of GM(1,1) model has different conditions. The proper model can be selected pursuant to distribution pattern of residual data. RGM(1,1) model applies to the residual data which is random, and the majority (or all of them) are positive (or negative); FRGM(1,1) model applies to the distribution pattern of the residual data which has cyclic variation; TRGM(1,1) model applies to the distribution pattern of the residual data which has both cyclic variation and linear trend.
(3)When establishing MRGM(1,1) model, it must be based on the distribution pattern of residual data in the stage of model fitting to choose adequate method to estimate the predicted value of the residual, which can establish a mechanism to determine whether the residual symbol is positive or negative. If the residual data has randomness and the majority are positive or negative, the predicted value of the residual should be estimated by FRGM(1,1) model; if the residual data both has cyclic variation and linear trend, the predicted value of the residual should be estimated by TRGM(1,1) model.
(4)When establishing RGM(1,1) and MRGM(1,1) model, it must adopt moving modification to transfer the residual sequence data to the non-negative sequence data to enhance the predictive ability of RGM(1,1) model and MRGM(1,1) model.
Advisory Committee Jung-Hsiang Yen - advisor

Files No Any Full Text File.
Date of Submission 2008-07-24