

A novel adaptive grey verhulst model for network security situation prediction

Abstract

Recently, researchers have shown an increased interest in predicting the situation of incoming security situation for organization's network. Many prediction models have been produced for this purpose, but many of these models have various limitations in practical applications. In addition, literature shows that far too little attention has been paid in utilizing the grey Verhulst model predicting network security situation although it has demonstrated satisfactory results in other fields. By considering the nature of intrusion attacks and shortcomings of traditional grey Verhulst model, this paper puts forward an adaptive grey Verhulst model with adjustable generation sequence to improve the prediction accuracy. The proposed model employs the combination methods of Trapezoidal rule and Simpson's 1/3rd rule to obtain the background value in grey differential equation which will directly influence the forecast result. In order to verify the performance of the proposed model, benchmarked datasets, DARPA 1999 and 2000 have been used to highlight the efficacy of the proposed model. The results show that the proposed adaptive grey Verhulst surpassed GM(1,1) and traditional grey Verhulst in forecasting incoming security situation in a network.