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论文

基于贝叶斯正则化的TDBPNN模型在中国外贸预报中的应用及评估

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An Application of the TDBPNN Model Based on Bayes' Regularization to Forecasting China's Foreign Trade and Evaluation

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- 摘要
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摘要 基于相空间重构的非线性预报思想,建立一个时滞的BP神经网络模型(TDBPNN),采用贝叶斯正则化方法提高BP网络的泛化能力,并将该模型应用于中国进出口贸易的预测,结果证明改进的TDBPNN模型具有较好的泛化能力,准确拟合了进出口贸易发展的历史值和趋势。区别于一般的预测评价,认为非线性预测不仅要注重数据拟合和精度改进,而且应该能够反映被预报系统的非线性特征。在分析模型预测精度的同时,通过计算拟合序列和原序列的非线性特征量进行模型评价,证实预测模型能够合理地“捕捉”到产生原序列的非线性系统的动力学特征。

关键词： 非线性预测 进出口贸易 相空间重构 BP网络 贝叶斯正则化

Abstract： Based on nonlinear prediction ideas of reconstructing phase space,this paper presents a time delay BP neural network model,whose generalization is improved utilizing Bayes' regularization.Furthermore the model is applied to forecast the import and export trades in China.The results show that the improved TDBPNN model has excellent generalization capabilities,which can not only learn the historical curve,but efficiently predict the trend of trade development.In contrast to conventional evaluation of forecasts,we assess the model by calculating the nonlinear characteristics of the predicted and original time series besides analyzing the precision of forecasting.The estimated values demonstrate that the dynamics of the system producing the original series has been reasonably captured in this model.

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