基于相关向量机的MEMS陀螺仪随机漂移补偿

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摘　要：

提出了一种基于相关向量机的MEMS陀螺仪随机漂移预测方法。针对MEMS陀螺仪随机漂移误差的非线性、不确定性等特点，建立了相关向量机预测模型，并采用EM算法获得模型的参数。针对随机漂移的混沌特性，利用相空间重构技术，将重构后的漂移序列作为输入变量进行模型的训练和预测。训练和测试结果均表明，该方法具有很好的预测效果，优于常用的时间序列分析法和支持向量机法。利用预测结果对随机漂移进行补偿，有效地提高了陀螺的使用精度。

关键词：MEMS陀螺仪，随机漂移，相关向量机，相空间重构，EM算法

Random Drift Compensation of MEMS Gyros Based on Relevance Vector Machine

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Abstract:

A prediction and compensation method for MEMS gyroscope random drift based on relevance vector machine is proposed in this paper. Objected to the nonlinearity and indetermination of random drift error, the relevance vector machine model is established, and the parameters of prediction model are got by the Expectation Maximization (EM) algorithm. According to the chaotic property of random drift, the drift time-series which have been reconstructed by phase space reconstruction are used in this model. Both the train and test results indicate that this method can predict the gyroscope random drift accurately. Its prediction accuracy is superior to the time series method and support vector machine. Gyroscopes application precision can be further improved in practical system if random drift is compensated by the predicting result.

Keywords: MEMS gyroscope; random drift; relevance vector machine; phase space reconstruction ;EM algorithm

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