

基于椭球拟合的三轴磁传感器误差补偿方法

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基金项目: 地磁导航中地磁稳定场矢量测量误差机理分析及补偿

摘要:

考虑现有多轴磁传感器的标定补偿方法普遍存在计算量较大、操作时间长、场地要求面积大、标定设备要求高等问题, 提出了基于椭球拟合的三轴磁传感器误差标定补偿方法。在分析传感器误差产生机理的基础上, 建立了磁传感器误差模型, 推导了误差系数的解算公式, 并利用椭球拟合的方法对三轴磁传感器进行了测试标定与误差补偿。实验结果表明, 该方法能够正确、有效地标定补偿三轴磁传感器不交误差、灵敏度误差和零偏误差, 具有修正过程简捷、省时、精度高特点不依赖于精密仪器提供准确的方向基准、水平基准等, 能够广泛应用于多轴矢量传感器的误差标定和有效补偿。

关键词: 三轴磁传感器; 误差分析; 标定补偿; 椭球拟合

Error Compensation Method for Three-axis Magnetic Sensor Based on Ellipsoid Fitting

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Abstract:

In view of the problem that the existing calibration and compensating method for three-axis magnetic sensor existed Large amount of computation, a long operation time ,a large area and demanding calibration equipment, an error compensation research for three-axis magnetic sensor based on ellipsoid fitting was presented. On the base of the analysis of sensor error, establish the error model of three-axis magnetic sensor, derive the solution formula of the error factor, and make use of ellipsoid fitting method to compensate the error in high accuracy. The results show that the method can correctly and effectively compensate the non-orthogonal sensor error, sensitivity error and bias error of the three-axis magnetic sensor. The correction process is simple ,time-saving, not depending on precision instruments to offer the baseline direction and datum, and can be widely used in the calibration and compensation of multi-axis vector sensor error.

Keywords: three-axis magnetic sensor; error analysis; calibration and compensation; ellipsoid fitting

投稿时间: 2011-12-28

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