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Title: The Influence of Turntable Fixing Errors on Optical Gyro Strapdown Inertial System Calibration

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摘要: 针对双轴转台标定时安装误差对光学捷联惯导标定的影响,推导了双轴转台安装误差与标定参数的数学关系,分析并量化了转台安装水平误差、方位误差对标定结果的影响。得到以下结论:转台安装误差对陀螺标定结果与加速度计零偏标定结果没有影响; 当转台安装水平误差为11'时,加速度计标度因数误差为10^{-5}; 假定加速度计真实失准角为5',转台水平误差为$1°$,则标定后的加速度计失准角误差仅为$0.1''$。结论可作为修正双轴转台安装误差的理论依据。

Abstract: The mathematic relations between fixing error of two-axis turntable and the calibration parameters were derived for analyzing the influence of the fixing errors of turntable on the optical gyro strapdown inertial system calibration. The influence of the horizontal and the orientational fixing errors of turntable on the calibration parameters were analyzed quantificationally. The conclusions are drawn as follows: fixing errors of turntable have no influence on the calibration parameters of three gyros and the biases of three accelerometers. The scale factor errors of three accelerometers are 10^{-5} when the horizontal error is 11'. Assuming real misalignment angles of three accelerometers are 5'and the horizontal error of turntable is $1°$, the calibration errors of misalignment angles are only $0.1''$. The results can be applied to adjusting the two-axis turntable.

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