MEMS陀螺仪零位误差分析与处理

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摘 要：

研究微机械陀螺仪的零位误差对提高惯性导航精度具有重要意义。论文采用Allan方差分析法对MEMS陀螺仪的零位误差做了综合评定，提出了一种动态的零值偏移误差补偿算法来滤除陀螺仪的零值偏移误差；论文还对启发式漂移消减法（HDR，heuristic drift reduction）做了改进，有效的提高了原算法的补偿精度。最后，再次采用Allan方差分析法对补偿后的零位误差进行评定，并以Voyager-IIA机器人为平台进行试验，结果证明了改进后的算法能显著的提高陀螺仪的输出精度。

关键词：MEMS陀螺仪；零位误差；启发式漂移消减法；动态补偿；Allan方差分析；

Analysis and Processing on Zero Position Error of MEMS Gyroscope

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Abstract:

Study on zero position error of MEMS gyroscope has a great value on improving the accuracy of inertial navigation system. Allan variance analysis method was adopted to evaluate on zero position error of MEMS gyroscope. A kind of dynamic zero offset compensation algorithm was presented to eliminate the zero offset error. HDR (heuristic drift reduction) was also improved and the compensation accuracy of original algorithm was increased effectively. Finally, Allan variance analysis method was adopted to evaluate on the compensated zero position error. Test had been done with the platform of gyro-equipped indoor mobile robot Voyager-IIA and the results show precision was increased significantly with the improved algorithm.

Keywords: MEMS gyroscope; zero position error; HDR; dynamic compensation ；Allan variance analysis

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