

应用于多旋翼MAVs的姿态测量系统

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摘要：

应用一个三轴加速度计、三个单轴角速率陀螺和一个三轴磁强计等微机械惯性传感器,设计廉价轻量姿态测量系统,研究了姿态角推算算法。在以往的姿态测量系统中,陀螺偏差和动加速度的影响限制其应用。将角速度陀螺的误差作为状态量导入到系统,动加速度作为噪音项导入到观测方程中,然后利用扩展卡尔曼滤波器来构成姿态估计算法来降低误差。实际飞行中对比商用高精度传感器和多次室外飞行测试表明,设计的系统能够应用于旋翼MAVs。

关键词：MEMS传感器; 航向姿态; 四元数; 扩展卡尔曼滤波器

Application of attitude measurement system in multi-rotor MAVs

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Abstract:

Devise a lightweight and low-cost attitude measurement system using a three-axis accelerometer, three single axis angular rate gyros, a three-axis magnetometer and other MEMS inertial sensors. Study the attitude angle estimation algorithm. In the past, the attitude measurement system, the gyro bias and kinetic acceleration effects limit its application. Put the error of the angular gyro into the system as state variables, and the kinetic acceleration as the noise term of the observation equation, then using the extended Kalman filter to form the attitude estimation algorithm to reduce the error. In actual flight compared with commercial high-precision sensor and several outdoor flight tests show that, the design of the system can be apply to rotor MAVs

Keywords: MEMS sensor; attitude heading; quaternion; extended Kalman filter

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