无位置输入的民机姿态航向误差修正算法

作　者：屈重君，雷宝权，陈璞,陆志东

单　位：西安飞行自动控制研究所，中国 西安，710065

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摘　要：
姿态更新算法与姿态误差修正算法是捷联姿态航向参考系统中一项长期研究的关键技术。研究了在无位置输入和无法计算位置项引起地球自转分量无法补偿的情况下，针对姿态航向系统仍必须提供可靠的、正确的姿态航向信息这一突出问题，提出了忽略误差方程中微小量，利用飞机航线覆盖区域的中心纬度值替代误差方程中的纬度项，将简化后的算法引入的误差等效为陀螺漂移和加速度计零位的思想。设计了基于四元数的内阻尼卡尔曼滤波器，更新姿态四元数修正误差。结果显示对于漂移为10 的光纤陀螺构建的系统，修正后姿态精度优于0.3 ，航向精度优于1 。

关键词：姿态航向参考系统；姿态计算；航向计算；卡尔曼滤波；误差修正；内阻尼滤波

The Error Correction Algorithm of Attitude and Heading for Civil Airplane without Position Inputs

Author's Name: QU Zhong-jun, LEI Bao-quan, CHEN Pu, LU Zhi-dong

Institution: Flight Automatic Control Research Institute, Xi'an 710065, China

Abstract:

The algorithm of attitude update and errors correction of attitude is a long-term key technique in strap-down attitude heading reference system. In the case of the component of earth's turn angular rate can not be compensated induced by without position inputs at the start of navigation and position determination during the navigation. The problem of attitude heading reference system must provide reliable and correct attitude and heading knowledge for aircraft is outline. A new algorithm of omitting the two order quality with a constant latitude value (Mean value of attitude covering range) submits for latitude value in the equation is expressed. Whilst, the errors induced by simplified algorithm equal to drift of Gyro and bias of accelerometer are discussed. Designed internal damped kalman filter based on quaternion was used to evaluate and update new system's error. The results show that the accurate of attitude better than 0.3 , the accurate of heading better than 1 with new integrated algorithm for FOG of 10 .

Keywords: AHRS; attitude calculation; heading calculation; kalman filter; error correction; internal damped filter

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