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圆感应同步器系统误差的动态提取与补偿

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Dynamic extracting and compensation of system error for rotary inductosyn

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摘要 图/表 参考文献 相关文章 (15)

摘要 由于采用圆感应同步器的光电转台系统的精度取决于圆感应同步器的角位置测量精度,故对圆感应同步器的系统误差进行了研究。分析了圆感应同步器系统误差的产生机理;使用相关的实验装置对圆感应同步器的系统误差进行了动态的定量测量;最后,结合数据处理和误差机理,确立了圆感应同步器的动态误差模型,并结合误差模型对圆感应同步器的输出信号进行补偿。对补偿方法进行了实验验证,结果显示:实验中使用的720极12位圆感应同步器的动态角度测量精度由补偿前的11.25"提高到了1.17",角速度估计精度由修正前的0.72(°)/s提高到了0.09(°)/s。这些结果表明提出的动态误差补偿方法能够显著提高圆感应同步器的动态测量精度,满足光电转台指向控制系统的精度要求。

关键词 : 圆感应同步器, 角位置误差, 角速度, 系统误差

Abstract : As the precision of a photo-turntable control system using rotary inductosyn depends on the dynamic angular position measuring precision of a rotary inductosyn, this paper explores the system error of the rotary inductosyn. The error mechanism of rotary inductosyn was analyzed, and the system error of the rotary inductosyn was quantitatively and dynamically measured by using an experimental platform. Finally, the system error model of the rotary inductosyn was put forward based on the data processing and error mechanism, and the output signals from the rotary inductosyn were compensated by the error model. The software compensation method was verified and the experimental results for the rotary inductosyn with 720 poles, 12 bits show that the dynamic angle measurement accuracy is improved from 11.25" to 1.17", while the angular velocity estimation accuracy is improved from 0.72 (°)/s to 0.09 (°)/s. The test results show that the proposed method improves the dynamic measuring accuracy of the rotary inductosyn significantly and satisfies the accuracy demands of photoelectric platform pointing control systems.

Key words : rotary inductosyn angle error angular velocity systematic error

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