

大视场数字式太阳传感器设计

作者：屠斌杰, 韩柯, 王昊, 白剑, 金仲和

单位：浙江大学

基金项目：国家自然科学基金青年基金

摘要：

提出了一种新型大视场数字式太阳传感器设计方法，其光学系统由全景环形光学镜头和滤光膜组成。该传感器具有视场大、结构简单及功耗低的特点。本文从工作原理出发，建立了该传感器模型，并利用搭建的实验平台，对传感器进行精度标定。本设计中，采用非线性最小均方最优解来确定模型中的参数。对测量误差进行分析，消除系统误差后，传感器的测量精度由 0.4° 提高到 0.02° 。测试结果表明此太阳传感器具有 $120^\circ \times 180^\circ$ 的大视场和 0.02° 的测量精度，能很好满足视场要求较高的姿态确定系统。

关键词：数字太阳传感器；大视场；全景环形光学镜头；标定

Design of Digital Sun Sensor with Large Field

Author's Name:

Institution:

Abstract:

A novel design of digital sun sensor with large field is presented in this paper. The optical system is composed of a filter and panoramic annular lens. This sun sensor has the following features: large field, simple structure and low power consumption. According to the mechanism of the sun sensor, both the model and calibration of the sensor are given based on the experiment platform. In this design, the parameters of the sensor model are determined using LMS method. At the end of this paper, the author discusses the error analysis and removes the system error. The result of testing indicates that the sun sensor has a large field of $120^\circ \times 180^\circ$ and a precision of 0.02° , and it can meet the requirement of attitude determination system which needs a large field.

Keywords: digital sun sensor; large field; panoramic annular lens; calibration

投稿时间：2010-09-07

[查看pdf文件](#)