# 基于单片机控制的太阳能电池板旋转系统设计

## 中文摘要

随着化石能源的减少和环境的恶化,对新能源的研究迫在眉睫。太阳能资源是一种绿色能源,是世界上储量最为丰富而且和人们生活密切相关。太阳能资源的合理使用可以解决能源枯竭的问题,太阳能的了解和运用是未来人类的能源问题能否得以解决的关键。

然而，太阳能电池板造价昂贵，发电率不足的问题需要我们去研究解决。太阳能跟踪系统是当前国内外研究的热点问题之一，对太阳全天候的跟踪，是提高对太阳能运用，利用率有着重大的意义。

利用单片机来对步进电机进行控制，步进电机再控制太阳能电池板，可以形成一个简单的太阳能跟踪系统。步进电机作为一种执行机构，它能够接受到脉冲信号，然后把接受到的信号经过自身转换成一个角位移量。步进电机内具有驱动器，当它的驱动器接受脉冲信号到时候，步进电机就会朝着早就设定好的方向来转动，转动的角度也是固定的，这就是步进电机的步距角。我们可以控制步进电机的脉冲数量，然后就能够控制步进电机的角位移量，控制好了步进电机的角位移量就能很好的控制它的位置，使位置更加准确。如果想要对步进电机进行调数，改变电机的转速和加速度便需要我们对步进电机的脉冲频率来进行控制。为了能够让太阳能电池板更加高效的发电，需要对电池板进行转动，让其跟随太阳，以便于获得更多的光照，因此可以利用步进电机来对太阳能电池板进行控制。

**关键词：**太阳能,自动旋转系统，单片机，步进电动机

# Abstract

With the decrease of fossil energy and the deterioration of environment, the research on new energy is extremely urgent. Solar energy is a kind of green energy, which is the most abundant in the world and closely related to people's life. The rational use of solar energy resources can solve the problem of energy exhaustion. However, solar panels are expensive and the problem of insufficient power generation rate needs to be solved. Solar energy tracking system is one of the hot issues at home and abroad. The all-weather tracking of the sun is of great significance for improving the utilization rate of solar energy. The stepper motor is controlled by single chip microcomputer, and then the stepper motor controls the solar panel, which can form a simple solar energy tracking system. As an actuator, the stepping motor can receive the pulse signal and then convert the received signal into an angular displacement by itself. The stepper motor has a driver, when its driver to receive pulse signal, the stepper motor will be set in the direction of rotation, rotation Angle is also fixed, this is the stepper motor step Angle. We can control the number of pulses of the stepping motor, and then we can control the angular displacement of the stepping motor. If we control the angular displacement of the stepping motor well, we can control its position and make it more accurate. If we want to adjust the stepping motor, we need to control the pulse frequency of the stepping motor to change the speed and acceleration of the motor. In order to make the solar panel generate electricity more efficiently, the solar panel needs to be rotated to follow the sun, so as to obtain more light. Therefore, the stepper motor can be used to control the solar panel.

Keywords: solar energy, automatic rotation system, single chip microcomputer, step motor

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