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Abstract
The goal of this paper is to increase the electrical power generated from solar cells. By experiments, the energy from sun tracking system increases by 23% to 25% more than the fixed angle solar system. However, experiments are conducted under a system which is designed in foreign country and is not suitable in Taiwan due to different geographical locations and whether conditions. In this paper, a new design of dual axis sun tracking system is proposed. This device uses optical sensors to detect the position of sun and is especially tested for use in Taiwan. Inside the device, the microcontroller 89C51 is programmed for the purpose of control. According to the experience, a fast and correct search for the position of sun is very important under changeable whether conditions. As the results of experiments, this device can search the position of sun in both sunny days and cloudy days. The device can also detect rainy days and keep tracking system unmoved without further consumption of energy. The light strength received from optical sensors is calculated in microcontroller for the decision of solar angles. The results are then compared with those derived from astronomical formula. It is found that the error of azimuth angle is nearly 2~4 degrees and the elevation angle has about 3 degrees of error in average. To the conclusion, the sensor in this paper can search the position of sun quickly and correctly.
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