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Abstract
Solar electricity is one of the most important renewable energies in the world, but the efficiency of solar cells is still low. If the angle of solar cells can always maintain perpendicular to the sunlight, better efficiency can be obtained. In this research, the mechanism of an automatic solar tracker is analyzed. This dual-axis solar tracker controls elevation and orientation angles of solar panels such that the panels always maintain perpendicular to the sunlight. Through the experiments, the current generated from solar panels and energy consumptions for the tracker are measured, and the efficiency and solar energy falling on the panels are compared between the solar tracker and fixed-angle systems. It is proved that the solar energy falling on the tracker system is 30% more than the fixed-angle system. If different types of weather conditions are considered, more energy is obtained for the tracker system by about 19%-24% in sunny days, and 4% in cloudy and rainy days. So it can be concluded that an automatic tracker system can develop much more solar energy under different types of weather conditions.
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