

Design of Pyramid Column Sensor with Photodiodes for Measuring Solar Power

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In this study, five photodiode detectors are used to constitute a solar power sensor that can measure both the directly incident and undisciplined power of solar light. The solar power sensor is composed of four trapezoidal facets along with an upper rectangular facet formed on top to constitute a rectangular pyramid column sensor. On each facet, a photodiode sensor is implemented to collect solar light power coming from different orientations including the directly incident and undisciplined power. By applying a perpetual calendar to obtain the corresponding azimuth angle and elevation angle of sunlight, the collected power data of the five detectors are employed to estimate the maximum directly incident power and undisciplined power of solar light by simple geometric transformation. Therefore, the proposed rectangular pyramid column sensor can effectively provide the detailed solar power data including directly incident and undisciplined power.

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