

A simple solar tracking system operated by discharging of water from a tank hanging from a lever

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The need to use electrical power to run motors in solar tracking systems is a serious problem. The power expended this way is comes from energy generated by solar panels.

In this paper, the results of a project to use the controlled discharge of water from a tank in a balanced lever to run a simple tracking system are given. The lever has a counterweight on one side and a water tank on the other. The solar panels are mounted on the lever and when the lever rotates, the panels also rotate by the same angle.

The discharge of water is controlled by an electronic circuit which gets signals from two sensors mounted on the lever. When the incident solar rays are normal to the lever, the two sensor readings are equal. When it is not so, the difference of the two signals from the sensors triggers an electronic circuit to open the discharge valve of the water tank causing the lever to rotate. When the solar panel is rotated in the correct direction by the required amount, the sensors generate the same readings and the electronic circuit stops the water discharge.

To prevent hunting behaviour at the setpoint, a deadband zone was introduced in the electronic circuit to improve the stability of the system. To withstand wind loading, the water tank and the lever are mounted on the ground level, whereas the solar panel structure is on the tree-top level.

Tests were performed on the prototype unit made using a 50 W solar panel. The results agree with the anticipated values at the design stage.

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