

SOLAR ENERGY OPTIMISATION BY PRECISION SUN TRACKING

A PROJECT REPORT

Submitted to

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ABSTRACT

In this modern, fast moving world there is a need for energy conservation. World is running by the energy of fossil fuels and atomic energy. These energy sources are harmful for the survival of human race. The fossil fuel sources are going to be extinct in few years and atomic energy sources radiate harmful radiations which may cause cancer. The alternative to the above is the solar energy which is non-exhaustible and clean. Hence, the concept of this project is of priority on international level since it deals with the energy optimisation technique for solar energy converters.

One of the widely available energy sources is the solar energy. Many researches have been conducted to convert this energy into useful energy by employing solar cells which convert light energy into electrical energy. The major drawback associated with the solar cell is their low efficiency. Further, their throughput reduces if they are not properly illuminated by the sun and do not employ sun trackers. In order to maximise power output from the solar panels, one need to keep the panels aligned with the sun throughout the day.

This project aims at maximising the conversion efficiency of solar collectors by precisely tracking the sun and changing the position of the solar panel correlated to the position of the sun for maximising the radiation degree of use. The tracker technique developed in this project monitors the sun at regular time intervals and aligns the solar concentrator as the sun moves in the sky dome by employing image processing techniques. The codes are written in MatLab 7.04.

The result shows that the conversion efficiency of the solar concentrators is increased due to maximum utilisation of the solar energy falling on the solar panels. During the bright sunny days the tracker easily located the sun and during the partial cloud coverage the tracker located the brightest region in the sky and moved the panel. When there is complete cloud coverage the tracker showed no movement until it located the brightest region in the sky. The developed system is working satisfactorily as per the design objectives.