Outdoor courtyard solar circle mechatronic system

How smart solar tracking system is based on mechatronics design approach?
This paper proposes the conception and development of smart solar tracking system,based on mechatronics design approach,such that the solar panel through both day and seasonal changes is accurately perpendicular to sunlight beam(accurately point towards sun),where illumination is strongest.

How does a mechatronic system work?
The behavior of the mechatronic system is as follows. The principal input is the sunlight, and the system must convert the solar energy into electrical energy (through PV-technology), regulating the voltage value of the PV modules, and finally store it.

How does a robotic solar sensor work?
The robotic sensor consists of a 2-DOF robotic arm having the same structure as the sun tracking system; that is,the actuated joints correspond to the azimuthal and elevation angles(see Fig. 5). The end effector (link) of the sensor includes a set of five photo-diode-based solar sensors (Amphenol SUF083J001),which are mounted as shown in Fig. 6.

What is solar tracking system motion control?
Solar tracking system motion control is simplified to an electric motor motion control,in terms of output angular displacement; therefore,the conception of solar tracking system can be presented as position control of one eclectic motor,considering the system operation is accomplished by one of two used two motors.

How to design a solar tracking system?
In solar tracking system design, any light sensitive device, can be used as light detecting sensor as input sensor unit including phototransistors, photodiodes, LDR and LLS05-A light sensors. A suitable, inexpensive, easy to program control unit is microcontroller; a suitable motion generator is electric motors and corresponding drive.

The proposed system includes a set of two systems: a tracking system for the main energy collection task and a second system having the same structure, which is used as a robotic sensor. The resulting design is capable of reducing the effects of the energy consumption of the motors, as well as of achieving a competitive rate of energy ...

The paper presents the mechatronic system for solar energy acquisition for using the system fed on. The mechatronic system with two independent movements affords the high accuracy positioning along the two axes for an optic beam narrowing having the main role of focusing the solar energy.

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About Circle Solar Circle SolerCircle-solar, is the leading supplier of the whole industry chain in PV mounting systems. Established in 2020, we have currently built up a manpower of 150 employees with the R& D team Circle-solar has been focusing on consistently providing convenient, reliable, and innovative solar mounting and tracking...

The structure (S) of this mechatronic system is given by the robot components (A), their properties (P) and their motional interrelation (R). The robot function is the transfer (T) of operational inputs (X) into functional outputs (Y). Sensors, processors and actuators form a control loop for the performance of the system. The most commonly used robot configurations are Articulated ...

The hardware design assembles the embedded microcontroller to the solar rotation mechanism consisting of two rotary DC motors driven by PMDC drives, linear actuators controlled by these DC motors, a pyranometer for solar radiation measurements, an anemometer for obtaining wind speed data, a global positioning system (GPS), tilt switches and ...

This paper reconceptualised the Residential Solar Block (RSB) proposed by Okeil (2010) to find the optimum design attributes of courtyard blocks in the hot-arid climate of Cairo, Egypt. For doing so, a methodology was presented to simulate the orientation, interspaces and building heights of three courtyard blocks to find the best ...

The study proposes a methodology--to be used during preliminary design--to compare the effect of alternative scenarios for courtyard buildings on outdoor microclimate, varying both the building...

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In this regard, the present study introduces a courtyard microclimate model to optimize the courtyard proportions in order to provide better indoor thermal conditions in different climates.

As a result of using this solar tracking system, the efficiency of the system was found to be increasing when compared to the system that does not use the process of solar tracking.[2] LESS LESS ...

Active solar trackers are in fact mechatronic systems, in which the actuation (on one axis, or on two axes, as the case may be) is performed by using controlled motor sources (linear and/or rotary actuators).

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Supplementary, various types of ...

The paper presents the mechatronic system for solar energy acquisition for using the system fed on. The mechatronic system with two independent movements affords the high accuracy positioning along the two axes for an optic beam narrowing having the main role of focusing the solar energy. The mathematical model and the design of its components are made by using ...

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This chapter presents a case study of mechatronic system design and prototyping of a two-axis solar tracking system ST100 utilizing microcontroller OOPic. Two stepper motors adjusting the ...

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