Abstract:

This paper describes the design and implementation of an energy efficient solar tracking system from a normal mechanical single axis to a hybrid dual axis. For optimizing the solar tracking mechanism electromechanical systems were evolved through implementation of different evolutional algorithms and methodologies. To present the tracker, a hybrid dual-axis solar tracking system is designed, built, and tested based on both the solar map and light sensor based continuous tracking mechanism. These light sensors also compare the darkness and cloudy and sunny conditions assisting daily tracking. The designed tracker can track sun's apparent position at different months and seasons; thereby the electrical controlling device requires a real time clock device for guiding the tracking system in seeking solar position for the seasonal motion. So the combination of both of these tracking mechanisms made the designed tracker a hybrid one. The power gain and system power consumption are compared with a static and continuous dual axis solar tracking system. It is found that power gain of hybrid dual axis solar tracking system is almost equal to continuous dual axis solar tracking system, whereas the power saved in system operation by the hybrid tracker is 44.44% compared to the continuous tracking system.

Keywords: Solar Tracker, Dual axis.