Adaptive control of solar tracking system

Solar tracking systems using single-axis or dual-axis configurations rely on slew drives to adjust the tilt and rotation of solar panels. This fine-tuned movement significantly increases energy ...

Abstract This chapter explores the design, implementation, and performance evaluation of a single-axis solar tracking system aimed at enhancing Solar Energy Conversion Efficiency ...

The Solar Tracker Market is expected to reach USD 62.97 billion in 2025 and grow at a CAGR of 21.20% to reach USD 152.76 billion by 2030. NEXTracker Inc., Array Technologies Inc., Arctech Solar Holdings, Soltec ...

In the face of the global carbon emission crisis, there are many limitations of traditional emission reduction technologies. In this paper, a large-scale carbon dioxide capture system based on ...

The system, featuring three integrated layers, dynamically enhances RF transmission efficiency through adaptive direction control. The proposed system shifts the conventional paradigm of ...

Maximizing output from renewable solar panels requires higher efficiency. Conventionally, such optimization techniques--MPPT (Maximum Power Point Tracking) along with heuristic ...

In this study, an adaptive control system (ACS) has been applied to a nonlinear system control problem. The Takagi-Sugeno (T-S) fuzzy control method has been extensively applied to ...

Key advantages of the proposed solar tracker include a 10-25% increase in energy output compared to fixed panels, improved land utilization, and cost-effectiveness over time. The ...

Precise force tracking control is an essential research for the aerial manipulator. This paper proposes an intelligent force tracking control architecture combining an aerial force analysis ...

The efficiency of solar water heating systems is strongly influenced by variable weather conditions, making the optimization of control strategies essential for maximizing energy ...

With the continuous growth of global demand for clean energy, improving the efficiency of photovoltaic power generation systems has become an important research topic. This study ...

This paper explores the design, analysis, and comparison of different control strategies for managing the speed of brushless direct current (BLDC) motors in electric vehicles (EVs) ...

In the paper, an adaptive optimal backstepping & sliding mode controller (AOBSC) using a neural network is proposed for trajectory tracking of a differential drive autonomous mobile ...

First, radial basis function neural networks (RBFNNs) are employed to approximate the unknown nonlinear dynamics of the QUAV system, with adaptive control laws designed for online ...

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