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Optimization of a Solar Water Pumping System in Varying Weather Conditions by a New Hybrid Method

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Abstract: *This research paper explores the design and implementation of a solar-powered water pump control system for field irrigation, focusing on the principles of photovoltaic and renewable energy utilization. The system utilizes solar panels to convert solar energy into electrical energy, which is stored in a lead-acid battery for later use. The embedded board MPLAB serves as the programming platform, facilitating control over the switching of motors for efficient water pumping operations. The system operates as a soft real-time system, prioritizing consistent functionality over immediate response time. User interaction is simplified through a toggle or push-button switch, minimizing manual effort. The flexibility of the system allows for the division of fields into different slots, catering to varied crop requirements and enabling precise control over water quantity supplied. By harnessing solar power to draw water from a storage tank, this technique offers a sustainable solution for field irrigation, contributing to the optimization of technical processes in agricultural settings.*

Keywords: Renewable energy, water pumping, technical optimization, autonomous system

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