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Application of the DTC Control in the Photovoltaic Pumping System

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Abstract : In this paper, we proposed a strategy for optimizing the performance for a pumping structure constituted by an induction motor coupled to a centrifugal pump and improving existing results in this context. The considered system is supplied by a photovoltaic generator (GPV) through two static converters piloted in an independent manner. We opted for a maximum power point tracking (MPPT) control method based on the Neuro - Fuzzy, which is well known for its stability and robustness. To improve the induction motor performance, we use the concept of Direct Torque Control (DTC) and PID controller for motor speed to pilot the working of the induction motor. Simulations of the proposed approach give interesting results compared to the existing control strategies in this field. The model of the proposed system is simulated by MATLAB/Simulink.

Keywords : solar energy, pumping photovoltaic system, maximum power point tracking, direct torque Control (DTC), PID regulator
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