

Sliding Mode Speed Controller of Photovoltaic Pumping System

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Abstract : This paper presents an analysis by which the dynamic performances of a permanent magnet brushless DC (PMBLDC) motor is controlled through a hysteresis current loop and an outer speed loop with different controllers. The dynamics of the photovoltaic pumping drive system with sliding mode speed controllers are presented. The proposed structure is constituted of photovoltaic generator associated to DC-DC converter controlled by fuzzy logic to ensure the maximum power point tracking. The PWM signals are generated by the interaction of the motor speed closed-loop system and the current hysteresis. The motor reference current is compared with the motor speed feedback signal. The considered model has been implemented in Matlab/Simpower environment. The results show the effectiveness of the proposed method to increase the performance of the water pumping system.

Keywords : photovoltaic, permanent magnet brushless DC (PMBLDC) motor, MPPT, speed control, fuzzy, sliding mode

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