

بيانات عن البحث السادس المقدم للترقية

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Advanced Strategy of Speed Predictive Control for Nonlinear Synchronous Reluctance Motors				عنوان البحث باللغة الانجليزية
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ملخص البحث باللغة الإنجليزية:				
<p>To gain fast dynamic response, high performance, and good tracking capability, several control strategies have been applied to synchronous reluctance motors (SynRMs). In this paper, a nonlinear advanced strategy of speed predictive control (SPC) based on the finite control set model predictive control (FCS-MPC) is proposed and simulated for nonlinear SynRMs. The SPC overcomes the limitation of the cascaded control structure of the common vector control by employing a novel strategy that considers all the electrical and mechanical variables in one control law through a new cost function to obtain the switching signals for the power converter. The SynRM flux maps are known based on finite element method (FEM) analysis to take into consideration the effect of the nonlinearity of the machine. To clear the proposed strategy features, a functional and qualitative comparison between the proposed SPC, field-oriented control (FOC) with an anti-windup scheme, and current predictive control (CPC) with outer PI speed control loop is presented. For simplicity, particle swarm optimization (PSO) is performed to tune all the unknown parameters of the control strategies. The comparison features include controller design, dynamic and steady-state behaviors. Simulation results are presented to investigate the benefits and limitations of the three control strategies. Finally, the proposed SPC, FOC, and CPC have their own merits, and all methods encounter the requirements of advanced high-performance drives.</p>				