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Robust Control of Traction Motors based Electric Vehicles by Means of High-Gain

Authors : H. Mekki, A. Djerioui, S. Zeghlache, L. Chrifi-Alaoui

Abstract : Induction motor (IM)Induction motor (IM) are nowadays widely used in industrial applications specially in electric vehicles (EVs) and traction locomotives, due to their high efficiency high speed and lifetime. However, since EV motors are easily influenced by un-certainties parameter variations and external load disturbance, both robust control techniques have received considerable attention during the past few decades. This paper present a robust controller design based sliding mode control (SMC) and high gain flux observer (HGO) for induction motor (IM) based Electric Vehicles (EV) drives. This control technique is obtained by the combination between the field oriented and the sliding mode control strategy and present remarkable dynamic performances just as a good robustness with respect to EV drives load torque. A high gain flux observer is also presented and associated in order to design sensorless control by estimating the rotor flux only using measurements of the stator voltages and currents. Simulations results are provided to evaluate the consistency and to show the effectiveness of the proposed SMC strategy also the performance of the HGO for Electric Vehicles system are nowadays widely used in industrial applications specially in electric vehicles (EVs) and traction locomotives, due to their high efficiency high speed and lifetime. However, since EV motors are easily influenced by un-certainties parameter variations and external load disturbance, both robust control techniques have received considerable attention during the past few decades. This paper present a robust controller design based sliding mode control (SMC) and high gain flux observer (HGO) for induction motor (IM) based Electric Vehicles (EV) drives. This control technique is obtained by the combination between the field oriented and the sliding mode control strategy and present remarkable dynamic performances just as a good robustness with respect to EV drives load torque. A high gain flux observer is also presented and associated in order to design sensorless control by estimating the rotor flux only using measurements of the stator voltages and currents. Simulations results are provided to evaluate the consistency and to show the effectiveness of the proposed SMC strategy also the performance of the HGO for Electric Vehicles system.

Keywords : electric vehicles, sliding mode control, induction motor drive, high gain observer
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