عنوان مقاله:

Power injection of renewable energy sources using modified model predictive control

محل انتشار:

دو فصلنامه تجهیزات و سیستم های انرژی, دوره 4, شماره 2 (سال: 1395)

تعداد صفحات اصل مقاله: 10

نویسندگان:

Seyed Seraj Hamidi - *Department of Electrical and Robotic Engineering, Shahrood University of Technology, Shahrood, Iran*

Hossein Gholizade-Narm - *Department of Electrical and Robotic Engineering, Shahrood University of Technology, Shahrood, Iran*

خلاصه مقاله:

This paper presents a simple model predictive control (MPC) approach to control the power injection system (PIS) for renewable energy applications. A DC voltage source and a single-phase inverter that is connected to the grid by an LCL filter form the PIS. Grid voltage is considered a disturbance for the system. For eliminating this disturbance, a modified model is proposed. It is usual to control output current to inject a desired power to grid. But due to the presence of the LCL filter, we face a third-order system and other states should be bounded during operation. In this work, we ensure the stability of other state variables and, consequently, system stability, by defining a proper cost function. In this regard, reference signals are calculated for all state variables. For getting the benefit of the switching nature of the inverter, we use a finite control set model predictive control (FCS-MPC). Proposed predictive control is implemented in a digital scheme and, thereby, the discrete model of the system is extracted. The proposed controller does not require any other control loop or modulation method. Simulation results show the effective performance of .the proposed control scheme

کلمات کلیدی:

Finite Control Set Model Predictive Control, Power Injection System (PIS), LCL Filter, Voltage Source Inverter (VSI), Renewable energy