(1)

Modeling and Maximum Power Point Tracking with Ripple Control of Photovoltaic System

G.El-Saady, El-Nobi A.Ibrahim, Mostafa Ahmed

Abstract:

Abstract - This paper presents parameters determination of photovoltaic (PV) module based on data-sheet parameters using Newton-Raphson iterative method. The characteristic of photovoltaic module are drawn based on the extracted parameters. Simulation and maximum power point tracking (MPPT) are developed using Matlab/Simulink. Incremental conductance (INC) method for MPPT is used to control a dc-dc boost converter with resistive load. Parameters of boost converter are designed to operate in continuous conduction mode. State- space averaging technique is used to control standalone PV module and obtain inductance value for certain amount of ripple in boost inductor current at different temperature and irradiance conditions.

Keywords:

photovoltaic module, MPPT, INC algorithm and state-space averaging

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(2)

OPTIMAL PHOTOVOLTAIC WATER PUMPING SYSTEM PERFORMANCE UNDER DIFFERENT OPERATING CONDITIONS

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Abstract:

This paper presents dc photovoltaic pumping system. The system consists of photovoltaic (PV) generator, boost converter and permanent magnet (PM) dc motor-pump set. Each part of the system is modelled. Photovoltaic generator parameters are extracted based on data-sheet parameters. Boost converter is designed to operate in continuous conduction mode (CCM) and controlled using incremental conductance (IC) algorithm for maximum power point tracking (MPPT).The system is simulated using Matlab/Simulink. The proposed system is studied under direct coupling and maximum power point tracking conditions. The results show a very good performance MPPT compared with direct coupling. The system is tested under varying conditions of temperature and radiation.

Keywords:

PV generator, pumping system, dc-dc boost converter and MPPT

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(3)

Performance of Photovoltaic Water Pumping System Under Different MPPT Algorithms

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Abstract:

Abstract This paper proposes an accurate model for DC photovoltaic pumping system. The system model begins with the photovoltaic module (PVM).The boost converter is used as an interfacing circuitry between the PVM and the motor. The DC motor is a permanent magnet (PM) type which coupled with a centrifugal pump. The boost converter is controlled using three different maximum power point tracking (MPPT) algorithms to extract the available power under changing conditions of radiation. Optimal duty cycle required to drive the boost converter is obtained using graphical steady state analysis. Further the system is built using Matlab/Simulink and tested with different atmospheric conditions.

Keywords:

Index term PV, pumping system, dc-dc boost converter and MPPT.

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