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MODEL PREDICTIVE CONTROL FOR MPPT OF DISTRIBUTED PHOTOVOLTAIC MODULE

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July 2017

ABSTRACT

Due to stochastic characteristics of solar energy which related to irradiation and temperature, a maximum power point of a PV panel was difficult to harvest. To overcome this problem, a maximum power point tracker (MPPT) used to continuously obtain the possibly maximum power point (MPP) of the solar panel produce. Many techniques used in the previous study commonly Perturb and Observe (P&O). Unfortunately, a P&O algorithm does not harvesting a true MPP of the PV panel during the operation. In this paper, a technique of MPPT using model predictive control (MPC) in renewable energy sources of photovoltaic (PV) module explained. In the PV system consists of PV module, a power converter which in this project was boost converter using a metal-oxide semiconductor field-effect transistor (MOSFET) as a switch, a MPC acts as MPPT to track the MPP. A PV panel consists of several cells, a boost converter and a MPC was designed using MATLAB/Simulink software due to the software provided enough toolbox and also Graphical User Interface (GUI). The main function of MPC used in PV system was to regulating a boost converter from an unregulated output produce by the renewable energy source of photovoltaic module by predict the future input and give appropriate duty cycle to the boost converter to harvest the possible maximum power point of the PV panel. A conventional P&O technique was design by develop the algorithm to compare the result. A plant using system identification developed as the MPC needs a plant for prediction. A couple of troubleshooting process was done to match the desired output. A slightly inaccurate result for MPC technique due to the plant develops in system identification.

ACKNOWLEDGEMENT

First and foremost, I am very grateful and would like to thank God for giving me time, strength and blessing to accomplish my final year project. Without His blessings, none of this is possible. Special appreciation goes to my parent for their love, understanding and unconditional support throughout this long and tough journey.

I wish to express my deep gratitude to my supervisor, Dr Mohd Najib bin Mohd Hussain for all his valuable advice, guidance, assistance and supports through this project. Without the continuous support, this project would not been the same as presented here.

I want to acknowledge the assistance from my fellow friends and technicians that willing to help me and for their continuous help and support.

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INTRODUCTION

1.0 OVERVIEW OF THE CHAPTER

In this chapter, it comprises of the introduction, research background of study that provide the general idea, the problem statement that was confronted, objectives of this study, the scope of work including the restrictions of the study and the thesis organization that summarize all the chapters.

1.1 RESEARCH BACKGROUND

Nowadays, a demand for renewable energy sources are kept in rising since the non-renewable resource that available today are going to deplete themselves within the years to come. Sun powered power is perfect green power that is made from daylight, or warmth from the sun. Introducing sun powered power frameworks in a private setting by and large means setting up a sun based photovoltaic or sunlight based warm framework on the rooftop. Sun powered vitality is a sustainable free wellspring of vitality that is economical and absolutely unlimited, dissimilar to non-renewable energy sources that are limited. It is likewise a non-contaminating wellspring of vitality and it doesn't radiate any nursery gasses while creating power. Sunlight based power can supplement your whole or halfway vitality utilization. Utilizing sun powered influence implies diminishing your vitality bills and sparing cash. Low support and subtle, introducing sun oriented boards enhances your home. Unfortunately, due to cost reduction of photovoltaic cells, it influences the popularity in using a renewable energy sources. Between a year 2004 to a year 2011, PV based power generation installed kept on rising [1-2, 22-26]. Moreover, the uses of the non-renewable such as coal, petroleum and natural gas have caused a dreadful effect to our