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A SINGLE MEASUREMENT OF COMBINED DIRECT AND INDIRECT MPPT ALGORITHM FOR MISMATCH PV MODULE APPLICATION

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ABSTRACT

The use of module integrated converter (MIC) topologies for photovoltaic (PV) system is to harvest the maximum power point of PV module from solar irradiance. MIC is a promising method to keep the electrical power output from PV module at maximum capacity through maximum power point tracking (MPPT) algorithm during full-sun and mismatch module occurrence. This thesis focussed on the development of PV module integrated with positive output (PO) buck-boost converter by intelligent control of MPPT technique. A novel of combination direct and indirect (CoDId) MPPT algorithm is implemented for solving mismatch losses from existing PV system by employing the implementation of system identification approach. System identification is established via utilization of multi-input single-output (MISO) model and incorporation with simple iteration scheme. The main intention of this study is to develop a single sensor measurement of instantaneous output current from PV system in order to track maximum power point of the PV module. The signal from the sensor is then applied for power switching devices of the PO buck-boost converter by the attained maximum power point current from CoDID MPPT method. The system is constructed from model-based design (MBD) of the PV system. The MBD is divided into four parts; executable system properties, design and simulation of the properties, execution and implementation for code generation and verification process. The properties dataset of building integrated PV system located in Malaysian Green Technology Corporation are taken as requirement and specification for the MBD system. The second aim is to provide a constant desired output DC voltage of the system. The criterion of maximum power produce from PV system is to produce the DC voltage from unregulated DC output voltage due to mismatch losses. Two control schemes; logic control and current closed-loop control are developed for retaining the required DC output voltage. The system also offer a flexibility of using different electrical specification of PV module in string connection solving the issue of the selection of PV module should be in similar specification. The development of the system is carried out using Matlab/Simulink incorporated with MPLAB programming for evaluating and validating the system. The ability of the system to track maximum power point regardless mismatching condition are assessed through simulation study and proved in the experimental work for different PV module specification and variable of solar irradiances.