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Literature Survey on Standalone Pumping Station for Agriculture Purpose using Solar PV

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Abstract**—**This paper consist of literature survey for Standalone Pumping Station for agriculture purpose using solar PV. We are in Initial stage of research on power electronics application in renewable energy sources we are analyzing literature & studying it for research point of view. Then we are going to modeled Solar PV & DC Motor.

Keywords*-Literature Survey, Power Electronics Applications in Renewable Energy Sources, Solar PV, DC Motor.*

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I. INTRODUCTION

The concept of the project is to utilize the abundant solar energy available, harness it for effective work output. Here we are trying to use solar energy to run the centrifugal pump for lifting the water from the well. This can be utilized for different purpose like irrigation for agriculture & nurseries, etc. Here we are collecting all information about which kind of constraints required for planning of standalone pumping station for agriculture purpose. In this paper we are finding out which are power electronics applications in renewable energy sources. This document will help all researcher to start work on Solar PV's, irrigation using renewable energy , as well as for finding the power electronics application in renewable energy sources.

II. LITERATURE SURVEY

C.L. Putta Swamy, Bhim Singh, B.P. Singh And S.S. Murthy," Experimental Investigations On A Permanent Magnet Brushless Dc Motor Fed By PV Array For Water Pumping System" Proposed that, practical study carried out on a Permanent Magnet Brushless DC (PMBLDC). Motor drive coupled to a pump load powered by photovoltaic (PV) array 1 for water pumping system. A simple low cost prototype controller has been designed and developed without current and position sensors which reduces drastically the overall cost of the drive system. This controller is dealing with dynamic behavior of the PMBLDC motor drive system. The mathematical model of the system is developed with a view to carry out a comparison between experimental and simulated response of the drive system. The necessary computer algorithm is developed to analyze the performance under different conditions of varying solar insolation for a pump load. The developed state space equations are simulated to obtain the performance characteristics which are also verified by conducting suitable experiment on the developed system.

Abu Tariq & MS. Jamil Asghar, "Matching of a Separately Excited DC Motor to a Photovoltaic Panel using an Analog Maximum Power Point Tracker" Proposed That, Water pumping systems powered by a photovoltaic maximum power point tracker (MPPT) is interfaced (PV) source normally use costly permanent magnet dc motor between the PV panel and the motor. The MPPT because of difficulties associated with the operation of PV powered shunt, series and separately excited motors. This paper includes input characteristics of the dc suggests use of a separately excited motor in place of a permanent motor with the output characteristics of the PV source, magnet motor. The proposed scheme uses a single PV source for forcing the system operating point towards the MPP supplying both armature and field winding. The field winding under all the operating conditions always receives constant current while the armature current C) Sun tracking. The incident solar energy of a PV panel is varies depending on the load and the ambient condition, such that maximum when the incident beam is normal to it the maximum available power is drawn from the PV source.

Mohanlal Kolhe, J.C.Joshi, and D.P.Kothari proposed that" Performance Analysis of a Directly Coupled Photovoltaic Water-Pumping System" Proposed That The application of a stand-alone directly coupled photovoltaic (PV) electromechanical system for water pumping has increased in remote areas of developing countries. In this work, the performance of a PV-powered dc permanent-magnet (PM) motor coupled with a centrifugal pump has been analyzed at different solar intensities and corresponding cell temperature. The results obtained by experiments are compared with the calculated values, and it is observed that this system has a good match between the PV array and the electromechanical system characteristics. Through manual tracking (i.e., changing the orientation of PV array, three times a day to face the sun) the output obtained is 20% more compared to the fixed tilted PV array. It has been observed that the torque-speed curve at low solar intensities for a PV electromechanical system should be steeper than at higher solar intensities, and the load torque-speed curve should be as steep as possible in the operating region with low starting torque. The performance analysis will be helpful to select the suitable PV electro-mechanical system for water-pumping applications.

Marcelo Gradella Villalva, Jonas Rafael Gazoli, and Ernesto Rupert Filho "Comprehensive approach to modeling and simulation of photovoltaic arrays" Proposed that this paper proposes a method of modeling and simulation of photovoltaic arrays. The main objective is to find the parameters of the nonlinear i–v equation by adjusting the curveat three points: open circuit, maximum power, and short circuit. Given these three points, which are provided by all commercial array datasheets, the method finds the best i–v equation for the single-diode photovoltaic (pv) model including the effect of the series and parallel resistances, and warranties that the maximum power of the model matches with the maximum power of the real array. With the parameters of the adjusted i–v equation, one can build a pv circuit model with any circuit simulator by using basic math blocks. The modeling method and the proposed circuit model are useful for power electronics designers who need a simple, fast, accurate, and easy-to-use modeling method for using in simulations of pv systems. in the first pages, the reader will find a tutorial on pv devices and will understand the parameters that compose the single-diode pv model. The modeling method is then introduces and presented in details. The model is validated with experiment.

Jagow C.D.Manning "Development of a photovoltaic array model for use in Power-electronics simulation studies" Proposed That To be able to develop a complete solar photovoltaic power electronic conversion system In simulation, it is necessary to define a circuit based Simulation model for a PV cell in order to Allow the interaction between a proposed Converter (with its associated control Arrangement) and the PV array to be studied. To do this it is necessary to approach the modeling Process from the perspective of power electronics; That is to define the desired overall model in Terms of the manner in which the electrical behavior of the cell changes with respect to the Environmental parameters of temperature and irradiance. The authors cover the development of a general model which can be implemented on Simulation platforms such as PSPICE or SABER And is designed to be of use to power electronics specialists. The model accepts irradiance and temperature as variable parameters and outputs the I/V characteristic for that particular cell for the above conditions.

"Sensorless Control Of A Permanent Magnet Synchronous Motor For PV-Powered Water Pump Systems Using The Extended Kalman Filteh" Proposed that ,The system studied in this paper is a sensorless control of a permanent magnet synchronous motor (PMSM). Its structure is based on the extended Kalman filter theory using only the measurement of the motor current for the on-line estimation of speed and rotor position. The PMSM, driving a water pump, is supplied by a PV array. The implemented PV array is designed for a peak power of 1 2 kW. To search the maximum power point (MPP) of the PV array, the inverter is operated with variable frequency adapting the power input of the motor. The PWM generation is done by space vector modulation. The motor voltages necessary for the Kalman algorithm are calculated considering the non-linearity of the inverter. The main control is done by a TMS320C31 DSP. The *U0* subsystem and the PWM generation are based on a TMS320P14 working as a slave-DSP. Finally, an evaluation of the experimental results is presented.

PV Water Pumping With A Peak Power Tracker Using A Simple Six Step Square Wave Inverter" Proposed that, The application of photovoltaic (PV) has been increasingly popular, especially in remote areas where power from a utility is not available or is too costly to install. PV powered water pumping is frequently used for agriculture and in households. Among many available schemes, the system under study consists of a PV array, a variable-frequency inverter, an induction motor, and a water pump. The inverter feeds the induction motor, which drives the water pump. To seek the optimum power output of the PV array, the inverter is operated at variable frequency to vary the output of the water pump. The inverter is operated to generate a six-step quasi-square wave instead of a pulse width modulated (PWM) voltage output to reduce the switching losses. The inverter acts as both a variable-frequency source and a peak-power tracker of the system, thus having the number of switches minimized. The system is a low-cost design with a simple control strategy. The bus is supported by a DC capacitor; thus, a balance-of-power flow must be maintained to avoid the collapse of the DC bus voltage. Another advantage of the system is that the current is limited to an upper limit of the PV array current. Thus, in case a short circuit is developed, the motor winding and the power semiconductor switches can be protected against excessive current flow.

III. SYSTEM STRUCRURE

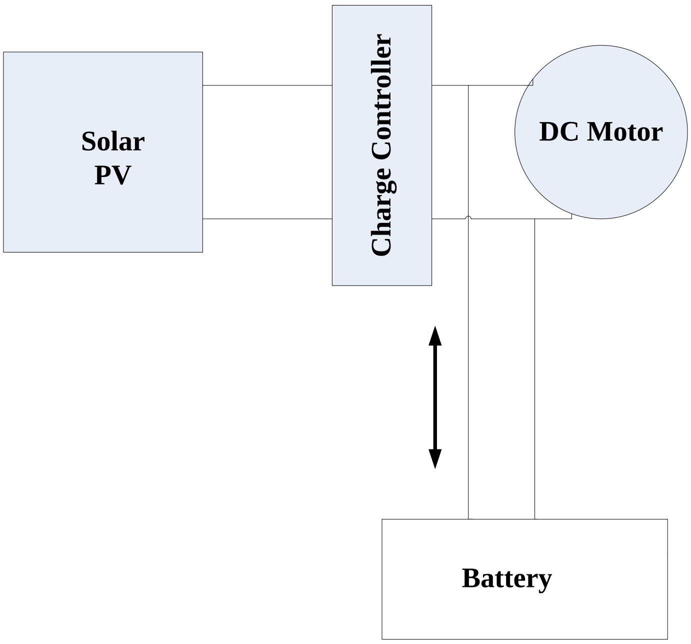

Figure 1. System structure

In proposed we are using solar energy by using solar photovoltaic for converting it into electrical energy. Using charge controller for we can charge the battery & sometimes for driving DC motor.

IV CONCLUSION

This paper conclude that without any current or position sensor using PMBDCM low cost prototype has been design. Maximum power point tracking must achieved when solar PV is as a input for DC motor. Directly Coupled Photovoltaic Water-Pumping System" Proposed That The application of a stand-alone directly coupled photovoltaic (PV) electromechanical system for water pumping has increased in remote areas of developing countries. we can

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analyze methods of modeling and simulation of photovoltaic arrays. Standalone pumping station can installed with a peak power tracker using six step square wave inverter will a power electronics application in renewable energy resources. We can provide sensorless control of PMSM for PV powered water pump system control.

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