SIMULATION AND IMPLEMENTATION OF SOLAR PV FED BRUSHLESS DC MOTOR USING LUO CONVERTER

A PROJECT REPORT

Submitted by

S. KAMALESH	**(112818105004)**
E.KIRUBAKARAN	**(112818105005)**
R.KRITHICK	**(112818105006)**
D.SIVAKUMAR	**(112818105008)**

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

ELECTRICAL AND ELECTRONICS ENGINEERING

T.J.S. ENGINEERING COLLEGE, PERUVOYAL

ANNA UNIVERSITY : CHENNAI 600 025

JUNE 2022

T.J.S.E.C. PERUVOYAL, KAVARAIPETTAI

PRINCIPAL
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipettai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.

BONAFIDE CERTIFICATE

Certified that this project report **"SIMULATION AND IMPLEMENTATION OF SOLAR PV FED BRUSHLESS DC MOTOR USING LUO CONVERTER"** is the bonafide work of the following students.

S.KAMALESH	**(112818105004)**
E.KIRUBAKARAN	**(112818105005)**
R.KRITHICK	**(112818105006)**
D.SIVAKUMAR	**(112818105008)**

who carried out the project work under my supervision.

SIGNATURE

Mrs.M.SHUNMUGA SANKARI,M.E.,(PhD.)
Associate Professor
HEAD OF THE DEPARTMENT
Department of Electrical and Electronics Engineering
T.J.S. Engineering College
Peruvoyal

SIGNATURE

Mr.A.PRAKASH,M.E.,
Assistant Professor
SUPERVISOR
Department of Electrical and Electronics Engineering
T.J.S. Engineering College
Peruvoyal

Submitted for viva voce held on 21/06/22 **at T.J.S. Engineering College, Peruvoyal.**

INTERNAL EXAMINER 21/6/22

21/06/22
EXTERNAL EXAMINER

T.J.S. ENGINEERING COLLEGE * T.J.S.E.C. * PERUVOYAL, KAVARAIPETTAI

PRINCIPAL
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipettai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.

ABSTRACT

This project deals with the operation of the LUO (DC-DC) converter in solar photovoltaic array as an intermediate DC-DC converter between the solar photovoltaic array and soft starting of BLDC motor.

Among the several types of DC-DC converters, a LUO converter is selected and it is used to extract the maximum power which is available from the solar photovoltaic array and BLDC motor.

The positive output LUO converter performs the changes from positive input source to positive output load source. To avoid the high frequency switching losses the electronically commutated brushless DC with voltage source inverter can be operated at elementary frequency which results in higher efficiency.

The project also connected with 230V alternating current gird, in case of cloudy day or rainy day, we can run the motor using alternating current.

PRINCIPAL
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipettai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.

EE8703	RENEWABLE ENERGY SYSTEMS	L	T	P	C
		3	0	0	3

OBJECTIVES:

To impart knowledge on the following Topics

- Awareness about renewable Energy Sources and technologies.
- Adequate inputs on a variety of issues in harnessing renewable Energy.
- Recognize current and possible future role of renewable energy sources.

UNIT I RENEWABLE ENERGY (RE) SOURCES **9**

Environmental consequences of fossil fuel use, Importance of renewable sources of energy, Sustainable Design and development, Types of RE sources, Limitations of RE sources, Present Indian and international energy scenario of conventional and RE sources.

UNIT II WIND ENERGY **9**

Power in the Wind - Types of Wind Power Plants(WPPs)-Components of WPPs-Working of WPPs- Siting of WPPs-Grid integration issues of WPPs.

UNIT III SOLAR PV AND THERMAL SYSTEMS **9**

Solar Radiation, Radiation Measurement, Solar Thermal Power Plant, Central Receiver Power Plants, Solar Ponds.- Thermal Energy storage system with PCM- Solar Photovoltaic systems : Basic Principle of SPV conversion – Types of PV Systems- Types of Solar Cells, Photovoltaic cell concepts: Cell, module, array ,PV Module I-V Characteristics, Efficiency & Quality of the Cell, series and parallel connections, maximum power point tracking, Applications.

UNIT IV BIOMASS ENERGY **9**

Introduction-Bio mass resources -Energy from Bio mass: conversion processes-Biomass Cogeneration-Environmental Benefits. Geothermal Energy: Basics, Direct Use, Geothermal Electricity. Mini/micro hydro power: Classification of hydropower schemes, Classification of water turbine, Turbine theory, Essential components of hydroelectric system.

UNIT V OTHER ENERGY SOURCES **9**

Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems. Wave Energy: Energy from waves, wave power devices. Ocean Thermal Energy Conversion (OTEC)- Hydrogen Production and Storage- Fuel cell : Principle of working- various types construction and applications. Energy Storage System- Hybrid Energy Systems.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to create awareness about renewable Energy Sources and technologies.
- Ability to get adequate inputs on a variety of issues in harnessing renewable Energy.
- Ability to recognize current and possible future role of renewable energy sources.
- Ability to explain the various renewable energy resources and technologies and their applications.
- Ability to understand basics about biomass energy.
- Ability to acquire knowledge about solar energy.

T.J.S. ENGINEERING COLLEGE

PRINCIPAL
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipettai,

TEXT BOOKS:

1. Joshua Earnest, Tore Wizeliu, 'Wind Power Plants and Project Development', PHI Learning Pvt.Ltd, New Delhi, 2011.
2. D.P.Kothari, K.C Singal, Rakesh Ranjan "Renewable Energy Sources and Emerging Technologies", PHI Learning Pvt.Ltd, New Delhi, 2013.
3. Scott Grinnell, "Renewable Energy & Sustainable Design", CENGAGE Learning, USA, 2016.

REFERENCES

1. A.K.Mukerjee and Nivedita Thakur," Photovoltaic Systems: Analysis and Design", PHI Learning Private Limited, New Delhi, 2011
2. Richard A. Dunlap," Sustainable Energy" Cengage Learning India Private Limited, Delhi, 2015.
3. Chetan Singh Solanki, " Solar Photovoltaics : Fundamentals, Technologies and Applications", PHI Learning Private Limited, New Delhi, 2011
4. Bradley A. Striebig,Adebayo A.Ogundipe and Maria Papadakis," Engineering Applications in Sustainable Design and Development", Cengage Learning India Private Limited, Delhi, 2016.
5. Godfrey Boyle, "Renewable energy", Open University, Oxford University Press in association with the Open University, 2004.
6. Shobh Nath Singh, 'Non-conventional Energy resources' Pearson Education ,2015.

T.J.S. ENGINEERING COLLEGE T.J.S.E.C. PERUVOYAL, KAVARAIPETTAI

PRINCIPAL
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipettai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.