SUPERCAPACITOR FOR PHOTOVOLTAIC APPLICATIONS

By

Eng. Mohamed Hussein Mohamedy Ali

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE

In

Electrical Power and Machines Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Under the Supervision of

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FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:
SUPERCAPACITOR FOR PHOTOVOLTAIC APPLICATIONS

Key Words:
Photovoltaic; Maximum power point tracking; Supercapacitor; Standalone PV system; Salp swarm optimization.

Summary:
This thesis focuses on improving the complete integration of hybrid energy storage system for solar energy to supply a constant level of power. A hybrid energy storage system (HESS), consisting of lithium-ion batteries and supercapacitors (SCs), will absorb and supply the necessary levels of power to keep the systems output power constant. Maximum power point tracking of the PV array using salp swarm optimization controller is one of the contributions of this work. The simulation results have demonstrated the efficiency of the proposed control scheme.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section

Name: Mohamed Hussein Mohamedy Ali Date: / / 2021

Signature:

Dedication

I dedicate this work to my father (Hussein Mohamedy -May Allah give mercy to his soul), my mother, my brother, and my sisters.

Acknowledgment

At first, all thanks are to the source of every success ALLAH. I would like to express my sincere gratitude to all those people whose guidance, encouragement, and inspiration has helped me in making this thesis successful. I would particularly like to appreciate my thesis advisor Associate Professor Mahmoud Sayed. His office door was always opened whenever I met a problem or had a question about my research.

I wish to express my love and gratitude to my beloved family, for their support and encouragement, through the duration of my studies.

My thanks are also extended to the staff of the Electronics Research Institute especially to the members of the PV cells Dept. and Nano lab, for their co-operation during the execution of the work.

Finally, I would like to appreciate my father. Even if he is not with me in here, I always feel his prayers behind me during my life and master education

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