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EESEE 2025

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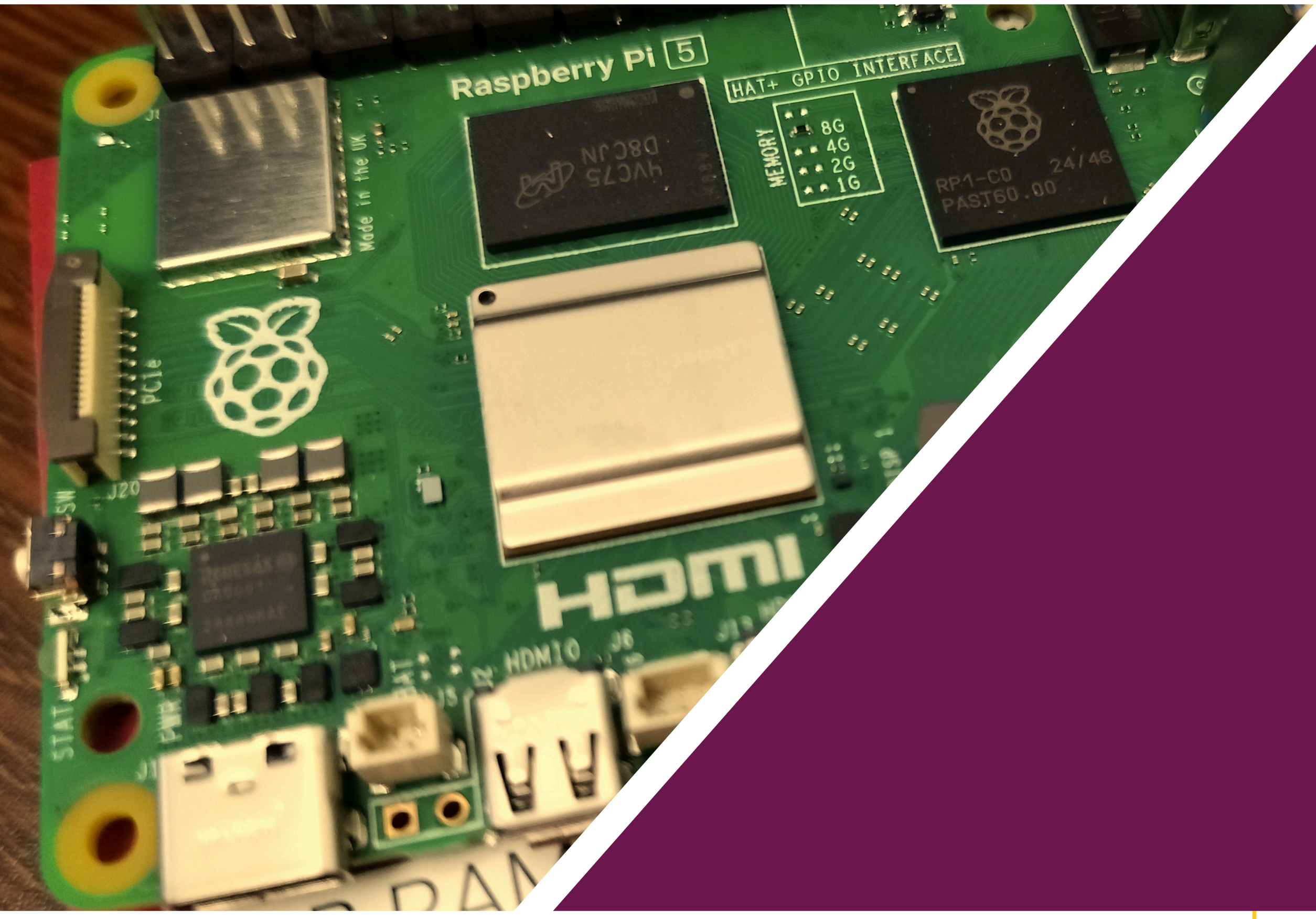
VOLUME 1



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FOREWORD BY THE PROGRAM CHAIR

Greetings from the Electrical, Electronics, and Systems Engineering Exhibition 2025 (EESEE 2025).

As the Program Chairs, it is our great pleasure to present this compilation of extended abstracts, showcasing the remarkable projects developed by our final-semester students from the Diploma in Electrical Engineering (Power) and Diploma in Electrical Engineering (Electronics) programs at Universiti Teknologi MARA, Cawangan Johor, Pasir Gudang Campus.

This exhibition marks a significant milestone in our students' academic journey, representing the culmination of years of dedication, perseverance, and learning. It also serves as an essential step toward the successful completion of their diploma studies. The projects featured this year are centered on the theme *Engineering Excellence: Bridging Technology and Life*, reflecting current trends and innovations in the engineering field.

This extended abstract book highlights not only the students' technical expertise but also their creativity, problem-solving skills, and ability to engage meaningfully with peers and industry professionals. Within these pages, you will find a diverse range of projects that embody a unique blend of knowledge, innovation, and practical application.

We warmly invite you to explore this collection, which celebrates the achievements of our aspiring engineers. Welcome once again to the Electrical, Electronics, and Systems Engineering Exhibition 2025. May the insights shared here inspire and pave the way for the next generation of innovative engineers.

Warm regards,

Dr. Fatimah Khairiah binti Abd Hamid
Dr. Atiqah Hamizah binti Mohd Nordin
Program Chairs
Electrical, Electronics, and Systems Engineering Exhibition 2025 (EESEE 2025)

Solar Power Generation for Home Using Matlab Simulink

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ABSTRACT

Solar power generation for home using MATLAB Simulink uses a graphical user interface (GUI) to show solar energy turn into usable power and adapt to varying load requirement. It incorporates photovoltaic (PV) panels, a buck converter, and a boost converter to optimize energy conversion and distribution. A custom GUI allows users to monitor and control key parameters such as irradiance and temperature. The integration of MATLAB Simulink provides accurate modelling and simulation to validate the system's performance. This project demonstrates efficient and solar energy utilization, making it suitable for applications in residential to the advancement of renewable energy solutions.

KEYWORDS: MATLAB, GUI, Power System, Buck converter, Boost Converter**.**

PRODUCT DESCRIPTION

This Solar Power Generation System is a simple and effective method of using solar energy. Designed and simulated using MATLAB Simulink with GUI to better understand how the generation will function. Users may choose the required irradiance and temperature and view the voltage measurement when it comes out of the PV panel, buck, or boost converter. The system's solar panels provide direct current power. A buck converter reduces voltage for lesser loads, whereas a boost converter boosts voltage for larger power needs. Both converters are managed to provide steady and efficient functioning under varying situations. The GUI allows users to monitor system metrics such as voltage and power output, giving an easy approach to manage performance. This system is practical, dependable, and appropriate for home, commercial, or industrial use. It provides a cost-effective method to renewable energy, facilitating the move to cleaner and more sustainable power sources.

SCHEMATIC DIAGRAMS & FLOW CHARTS

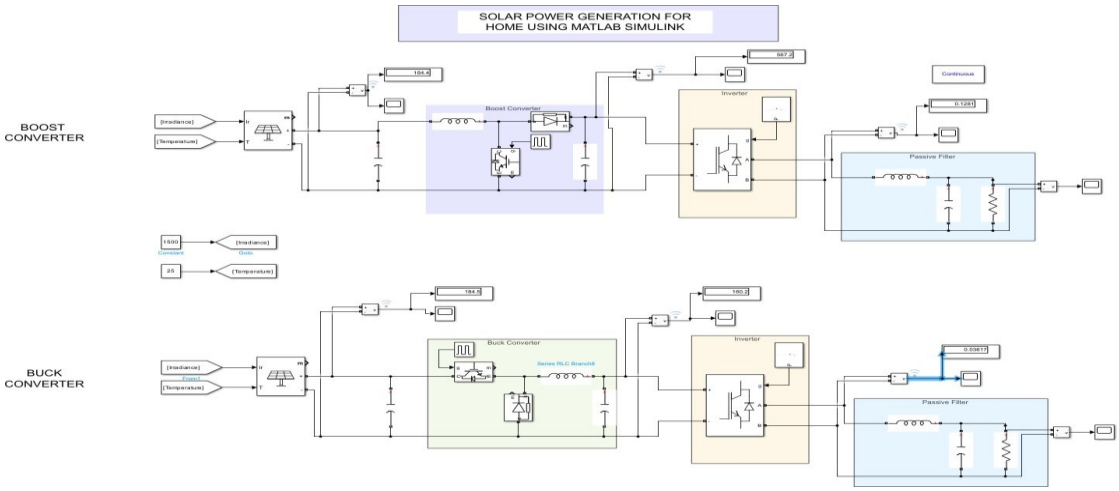

Figure 1: Circuit diagram Solar Power Generation For Home Using MATLAB Simulink

Figure 2: Main page for Solar Power Generation For Home Using MATLAB Simulink

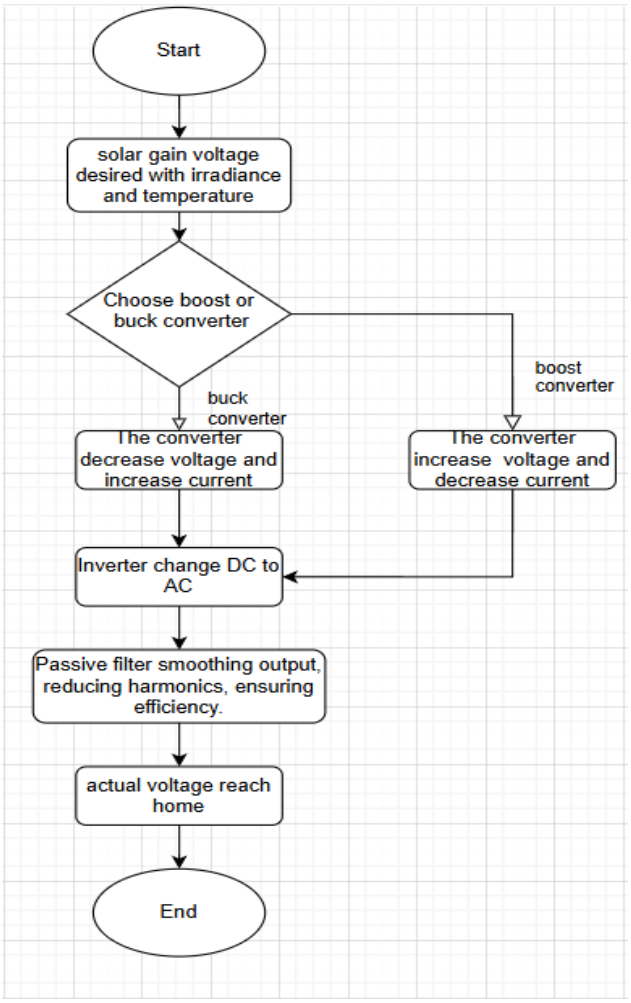

Figure 3: Flowchart Of Solar Power Generation for Home Using MATLAB Simulink

NOVELTY AND UNIQUENESS

The novelty of this solar power generation system lies in its efficient design, integrating both buck with boost converters to handle a wide range of voltage requirements, ensuring adaptability for various applications. Unlike conventional systems, it operates without complex Maximum Power Point Tracking (MPPT), to simplify the control. The user- friendly GUI usability, enabling real-time monitoring and control of system parameters without the need for advanced technical expertise. The system ensures accurate performance testing and allows for easy customization to meet specific needs. The MATLAB Simulink and GUI system and design allow for students greatly understand about the usage solar power generation.

BENEFIT TO MANKIND

This MATLAB-based solar power generating simulation has important teaching and research applications. It is a useful tool for learning about renewable energy ideas, power electronics, and control systems since it models a working solar energy system with integrated buck and boost converters. Users may use the simulation to experiment with different situations, optimize designs, and anticipate system behavior without having to invest in expensive hardware. It advances information diffusion by making renewable energy ideas more accessible to students, researchers, and engineers. Technology also helps to find creative solutions to global energy concerns by offering a virtual platform for testing and refining new ideas. In the long run, these models encourage the use of renewable energy technology.

COMMERCIALIZATION POTENTIAL

The system can be marketed to engineering firms and training centres as a platform for prototyping and testing solar power system designs. It supports the development of custom energy solutions by allowing users to experiment with different configurations and control strategies in a risk-free environment. The user-friendly graphical interface adds to its appeal, making it accessible to a broader audience, including those with limited technical expertise. By packaging the system as a software application or toolkit, it can be offered as a cost-effective alternative to hardware-based testbeds. This aligns with the growing demand for virtual simulation tools in the renewable energy market, making it a viable product for commercial deployment.

CONCLUSION

The Solar Power Generation for Home using MATLAB Simulink is a useful tool for studying and designing renewable energy systems. By seeing buck and boost converters with an easy-to-use graphical interface, it provides an efficient and accessible approach to analyze solar power systems without the need for expensive hardware setup. The simulation's capacity to simulate and evaluate many situations facilitates research, teaching, and innovation in renewable energy technology. This study demonstrates the potential of simulation tools for tackling global energy concerns, spreading information, and promoting the adoption of sustainable solutions. The system's cost-effective design, scalability, and practical uses make it an ideal instructional resource as well as a platform for future renewable energy improvements.

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