

Adaptive PDLC Smart Film for Dynamic Solar Radiation Control in PV Systems

Publisher: IEEE

Cite This

PDF

Nabaa T. Salman ; Wasan A. Wali

All Authors

25

Full

Text Views

Abstract

Document Sections

I. Introduction

II. Methodology

III. Experimental Procedure

IV. Result and Discussion

V. Conclusion

Authors

Figures

References

Keywords

Metrics

More Like This

Abstract:

Although solar radiation is essential for the operation of solar cells, excessive radiation causes cell damage. Despite the presence of fixed protective coatings and covers, they lack the dynamic ability to control solar radiation. This study proposes an integrated smart control system based on Polymer Dispersed Liquid Crystal (PDLC) to instantly control radiation changes and instant fault detection technology. The smart film adjusts the incident radiation by changing its transparency using electrical voltage or changing its height above the cell surface. An adaptive neuro fuzzy inference system (ANFIS) is used to simulate PDLC behavior and PID controller to control the distance between PDLC and solar cell. The results showed the film's ability to fully control approximately 37% to 90% of the radiation at varying height, controlling the output of solar cells from full to partial output, protecting them, and accurately.

Published in: 2025 International Conference on Advances in Electrical Engineering and Computer Applications (AEECA)

Date of Conference: 22-24 August 2025

DOI: 10.1109/AEECA65693.2025.00069

Date Added to IEEE Xplore: 19 January 2026

Publisher: IEEE

ISBN Information:

Conference Location: Dalian, China

Recommended for You (Beta)

- Fractional-Order PI Controller Implementation on a...
- Fractional Order PID Controller Design and Tuning via Oustaloup Approximation for TCLab System
- Fractional-order PID Control of an Aeropendulum Simulation Model

Learn More



Sign in to Continue Reading

Authors	▼
Figures	▼
References	▼
Keywords	▼
Metrics	▼

Need
Full-Text

access to IEEE *Xplore*
for your organization?

CONTACT IEEE TO SUBSCRIBE >

IEEE Personal Account	Purchase Details	Profile Information	Need Help?	Follow
CHANGE USERNAME/PASSWORD	PAYMENT OPTIONS VIEW PURCHASED DOCUMENTS	COMMUNICATIONS PREFERENCES PROFESSION AND EDUCATION TECHNICAL INTERESTS	US & CANADA: +1 800 678 4333 WORLDWIDE: +1 732 981 0060 CONTACT & SUPPORT	f @ in v