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Edited By
Arindam Mondal
Souvik Ganguli

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PV System Maximum Power Point Tracking Under Partial Shadowing Using Gray Wolf Optimization Algorithm

Snehashis Ghoshal and Arindam Mondal*

Dr. B. C. Roy Engineering College, Durgapur, West Bengal, India

Abstract

Solar energy is utilized efficiently with photovoltaic (PV) installation when operated at or near the point of maximum or peak power. In order to implement such an operation, proper tracking becomes essential, which is undoubtedly a challenging objective as PV systems possess a multitude of peaks on their power-voltage characteristics due to varying weather conditions, particularly during partially shaded conditions. The main drawback of conventional MPP is the proper step size selection. Otherwise, the system may be operated at a local MPP instead of the global MPP. In the present study, gray wolf optimization was adopted in the MPPT controller and a comparative analysis was carried out between GWO and P&O-based results on the same system simultaneously. The outcomes reflected the efficacy of the proposed methodology during partially shaded conditions.

***Keywords*:** Photovoltaic system (PV), tracking of maximum power, partially shaded condition, perturb and observe technique, gray wolf optimization

10.1 Introduction

The ever-increasing demand for energy and the detrimental impact of pollution make it necessary to put significant efforts into environment-friendly renewable resources. Among different renewable resources, solar energy possesses a good potential for power generation due to its abundance throughout the globe [1]. A major part of solar energy is extracted through

**Corresponding author*: armsvist@gmail.com

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