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# A NOVEL TRACKING APPROACH FOR SOLAR POWER GENERATION SYSTEM

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**ABSTRACT:**

Usually in realistic application, solar cells are typically influenced by means of partially shaded conditions. Maximum power point tracking functions and keep up a solar cell at its highest power output. An accurate as well as speedy global maximum power point tracking method is necessary hence our study will present a novel method of global maximum power point tracking which may perhaps be tracked speedily and effectively in various shaded conditions. The proposed global method contains two stages such as in the first stage, segmentation at permanent

an interval was employed to look for the interval of global maximum power point. In the other phase, variable-step perturb & observes technique was employed to discover accurate position of the global maximum power point. The structural design of projected method is effortless and can be put into practice by means of a low-cost micro-controller and moreover projected method can effortlessly be incorporated into conventional firmware.

***Keywords: Partially shaded conditions, Global maximum power point tracking, Solar cells, Perturb & observe, Micro- controller.***

## 1. INTRODUCTION:

There is an improvement in environmental considerations because of greenhouse effect, and exhaustion of energy sources has concerned extensive consideration towards renewable energy sources. Among a variety of sources of renewable energy, making of solar power is a hopeful energy source [1]. The characteristic P-V curve of solar cell is nonlinear, as well as maximum power is obtained only when system is functional at peak point of P-V curve and this approach is identified as maximum power point tracking (MPPT). The technique of maximum power point tracking is used to function and maintain a solar cell at its highest power output. Since the conventional methods of maximum power point tracking just track local maximum value, methods that discover global maximum value have to be introduced to continue maximum power point tracking. Our study put forward a novel method of global maximum power point tracking which may perhaps be tracked speedily and effectively in various shaded conditions. The structural design of projected method is effortless and can be put into practice by means of a low-cost micro controller. Several methods of global maximum power point tracking were introduced for managing of partially shaded conditions in the earlier works of literatures [2][3]. The global maximum power point tracking technique might track global maximum power point of P-V curve of numerous peak values effectively and might recognize changes within characteristic curve. In the proposed global maximum power point tracking, segmentation at permanent intervals was employed to look for the interval of global maximum power point. Variable-step perturb & observe technique was employed to discover accurate position of the global maximum power point.

## 2. METHODOLOGY:

Maximum power point tracking maintains the solar cell at its highest power output and there are several methods of maximum power point tracking that were proposed, such as including open-circuit voltage, perturb & observe, short-circuit voltage and so on. These methods of maximum power point tracking contain a good quality of tracking performance when insolation is consistent. Series associated solar cell arrays are occasionally shaded by clouds, as well as trees, results in non- consistent insolation. This makes the P-V curve to

contain several peak values at various heights. When maximum power point (MPP) is tracked by means of abovementioned techniques, the found maximum power point might be local maximum power point rather than global maximum power point. Hence an exact and speedy global maximum power point tracking method is necessary. We put forward a novel method of global maximum power point tracking which may perhaps be tracked speedily and effectively in various shaded conditions. In the proposed system, where the segment containing global maximum power point is determined by means of sectional scanning. The architecture of projected method is effortless and can be put into practice by means of a low-cost micro controller. Architecture of projected method can also effortlessly be incorporated into conventional firmware. The proposed global maximum power point tracking contains two stages such as in the first stage, segmentation at permanent intervals was employed to look for the interval of global maximum power point. In the other phase, variable-step perturb & observe technique was employed to discover accurate position of the global maximum power point. The fundamental feature of a solar cell is modelled as the equivalent circuit that includes a current source, a diode, and a series of corresponding resistance as well as a parallel corresponding resistance. Bypass diodes are added to protect solar cell from effect of hot-spot that is caused by partially shading condition [4]. Hence the bypass diode that is linked in parallel to shaded cell will carry out to permit current from the cell of non-shaded to pass by shaded cell, which prevents shaded cell to go as reverse bias.

## 3. AN OVERVIEEW OF PROPOSED SYSTEM:

Quite a lot of methods of global maximum power point tracking were set up for managing of partially shaded conditions in the previous works. The open-circuit voltage (OCV) of single solar cell is identified earlier, and when numerous solar cells are associated in series, the entire open circuit voltage can be considered. Hence, as long as measured entire circuit voltage is divided into sufficient sections, there are not more than one peak values within each section interval. When the power is sampled at a particular position within each interval, this power will stand for the interval [5]. Subsequently, representative powers of a

variety of intervals are compared, and perturb & observe method is used to discover global maximum power point in interval by maximum power. In order to enhance tracking speed, we make use of variable-step perturb & observe method. When distance to global maximum power point is longer, an outsized step size is utilized for perturbation; when distance to global maximum power point is shorter, a less important step size is utilized as an alternative. Hence this technique will pay concentration to tracking speed as well as accuracy. In view of the fact that the conventional methods of maximum power point tracking just track local maximum value, methods that discover global maximum value have to be introduced to continue maximum power point tracking. Our study suggest a novel method of global maximum power point tracking which may perhaps be tracked speedily and effectively in various shaded conditions. In the proposed method entire open-circuit voltage of series associated solar cells is obtained and upper as well as lower range is determined. The number of sections is greater than number of panels within series connection. Power of every section point is considered as representative power; of interval, and interval with highest representative power is described as global maximum power. Variable-step perturb & observe technique is used for interval with global maximum power point. An outsized step size is adopted, and subsequently once the global maximum power point is approached, a minor step size is assumed for perturbation on. When search is finished variation of power value by time is verified, so as to make sure there is no transform in insolation. In the proposed system, where segment containing global maximum power point is determined by means of sectional scanning. The structural design of projected method is effortless and can be put into practice by means of a low-cost micro controller. While shading patterns are difficult as well as changeful in actual world, whether projected method can work accurately with consistent insolation, as well as whether global maximum power point is tracked as well as converged speedily and accurately in various shading patterns, have to be considered to confirm the global maximum power point tracking technique. When consideration of active nature of insolation as well as shading patterns within a true environment, shading pattern was altered constantly during testing, to prove

that proposed technique might detect change in insolation and effectively track position subsequent to change accurately. The projected global maximum power point tracking technique might track global maximum power point of P-V curve of numerous peak values effectively and might recognize changes within characteristic curve.

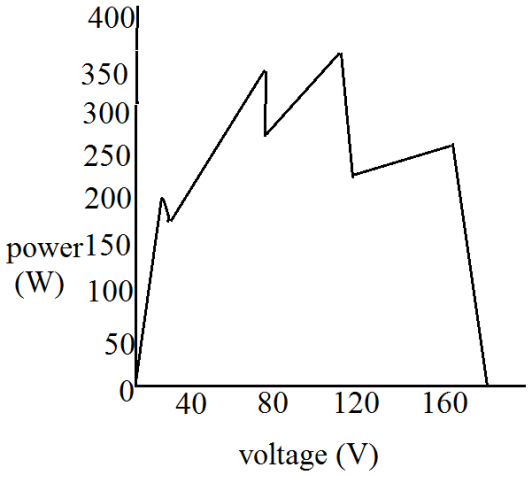


Fig1. An overview of schematic illustration of proposed technique.

## 4. CONCLUSION:

While the established techniques of maximum power point tracking track local maximum value, methods that discover global maximum value have to be introduced to continue maximum power point tracking. Our study suggest a new method of global maximum power point tracking which may perhaps be tracked speedily and effectively in various shaded conditions. Many techniques of global maximum power point tracking were introduced for managing of partially shaded conditions in the earlier works of literatures. Projected system is effortless and can be put into practice by means of a low-cost micro controller and effortlessly be incorporated into conventional firmware. The proposed system includes two stages. In the first stage, segmentation at permanent intervals was employed to look for the interval of global maximum power point and in the other phase, variable-step perturb & observe technique was employed to discover accurate position of the global maximum power point. In the proposed scheme, segment containing global maximum power point is determined by means of sectional scanning.

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