

**GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES****A REVIEW ON PARTICLE SWARM OPTIMIZATION AND ITS APPLICATION TO MPPT**Arpita Jena<sup>1</sup>, S.M Ali<sup>2</sup>, Ritesh Dash<sup>3</sup>, Subash Chandra Sahoo<sup>4</sup>Director Best Group Of Institutions<sup>1</sup>Associate Professor School Of Electrical Engg. KIIT, University<sup>2</sup>Research Scholar<sup>3,4</sup>

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**ABSTRACT**

In most of the application sometimes it is very difficult to find a particular solution for a given stated problem. It is due to the availability of different solution at a particular time. Therefore it is required to optimize the solution at a particular point. Again the solution must satisfy some predefined criteria to increase the efficiency of the system. Vast amount of data drag the researchers to focus themselves on the optimization theory to find the best result. A similar situation exists for the solar photovoltaic applications. Here with increase in the solar radiation and temperature the output of the system also increases. This change in the output will also change the power delivered to the load at a particular time. So it is required to put a device in the vicinity which can track as well as can increase the system accuracy and also drives the system to a particular point where maximum power can be extracted from the system. This concept lead to finding a solution through the optimization algorithm which not only satisfy the group but also satisfy the cell in individual.

**Keywords:-** Algorithm, Optimization ,MPPT, Solar Photovoltaic

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**I. INTRODUCTION**

Extraction of parameter from the data base is more difficult if it is crowded with similar type of data. But one of the advantage of increase in data is the flexibility to find out the best result from a group of data. It also decreases the speed of data extraction from the data base. These datas are then mixed and integrated and are stored in a data base for further optimization. With some good transformation technique they are transformed into a particular data mining from where they are recognized and processed further for system improvement. For finding the best performed solution sometimes knowledge based solution technique is also applied to the extracted solution. The available data may be in a structured or non structured format for its simplification process. Audio, Video signal can be applied to the solution for better improvement in its performance. So data clustering is a process where both the clustered and non clustered data are combined and are stored in a data base.

Sun is basically regarded as the abundant source of energy. Solar photovoltaic industry has achieved a remarkable growth due to the vast increasing in popularity and its user friendly use. To meet the global energy demand it is the only source through which the demand can be compensated. However due to the restriction in the performance its efficiency is now just limited to only 40% under laboratory testing condition. However in the real practical field it is limited to 25% and having a life span of 20years. A lot of research on the solar cell is going on throughout the world to increase the performance of the system.

The solar harvesting is a weather dependent quantity. Under clean sunny condition it produces maximum amount of power where as under cloudy condition its output is very less. Some of the artificial factor like shading is one of the problems of lower output. This shading may be due to the dust, or shadow of a large building. So it is required to clean the panel in a regular interval of time so as to maximize its performance.

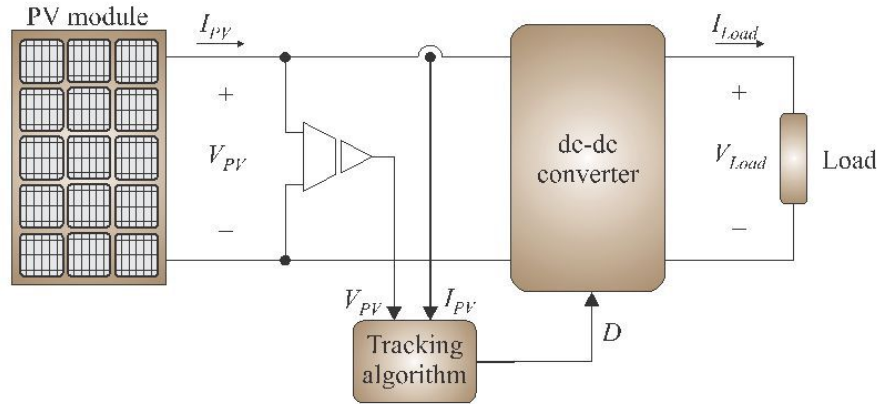


Fig:-1 Block Diagram Of Grid Connected Solar Cell

Sun radiates energy uniformly in the form of electromagnetic wave. This solar energy is a reliable, unlimited and clean source of energy. The major drawbacks of this energy is ,it is a dilute form of energy, which is available intermittently and uncertainly, and not steadily and continuously. But it is more predictable than wind energy. The solar energy reaching the earth is  $1.5^{18}$  KWh/year. However having precise and detailed information regarding the behaviour of solar generators (solar cells, solar modules solar arrays, etc.) is a must for an efficient use of this clean and unlimited energy source. Photovoltaic system can be considered as one of the most wide spread solution with promising margin of improvement while ensuring the generation of energy with low environmental impact. Solar photovoltaic technology has made great progress in recent year.

II. PERTURB & OBSERVANCE

Maximum power point tracking system is generally used in solar photovoltaic system for extracting the power from the system in order to meet the dynamic energy demand. The MPPT basically works on the predefined topology. Among the different available topologies the P&O method is accepted worldwide because of its simplicity and less number of unknown parameter.

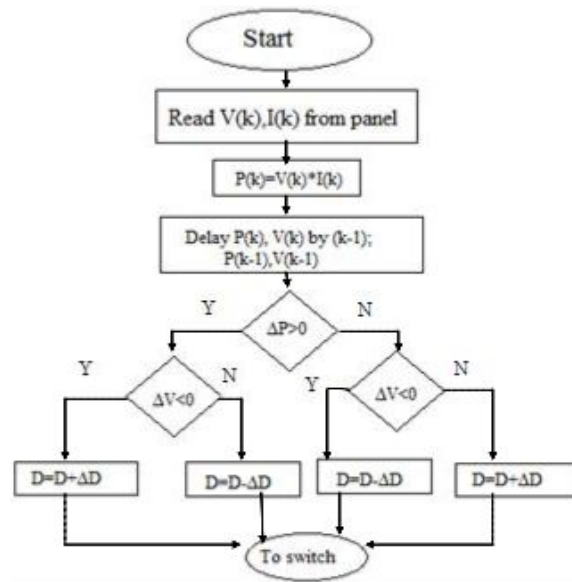


Fig:-2 Flow Chart of P&O Method

Each time the output voltage is compared with the pre defined voltage, Any change in the voltage label drives the circuit to a new point where it matches the load level. Here the new operating voltage fluctuates around the central

point till it finally converge to a stable point, this leads to the loss of energy and requires more time. Sometimes a sudden change in weather condition drives the operating point far away from the stable point. So this requires an optimization technique to drive the system back to the stable point.

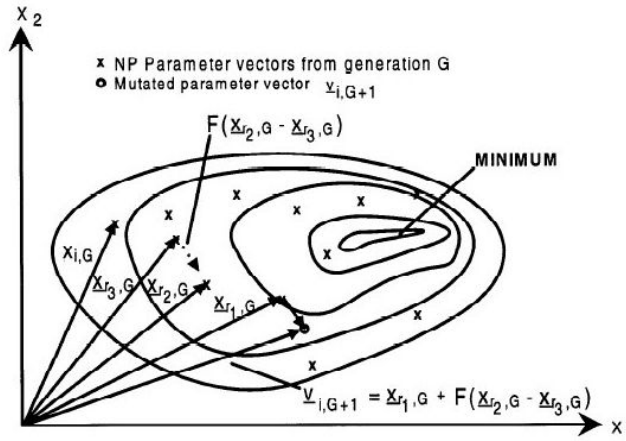


Fig:- 3 Convergence of parameter

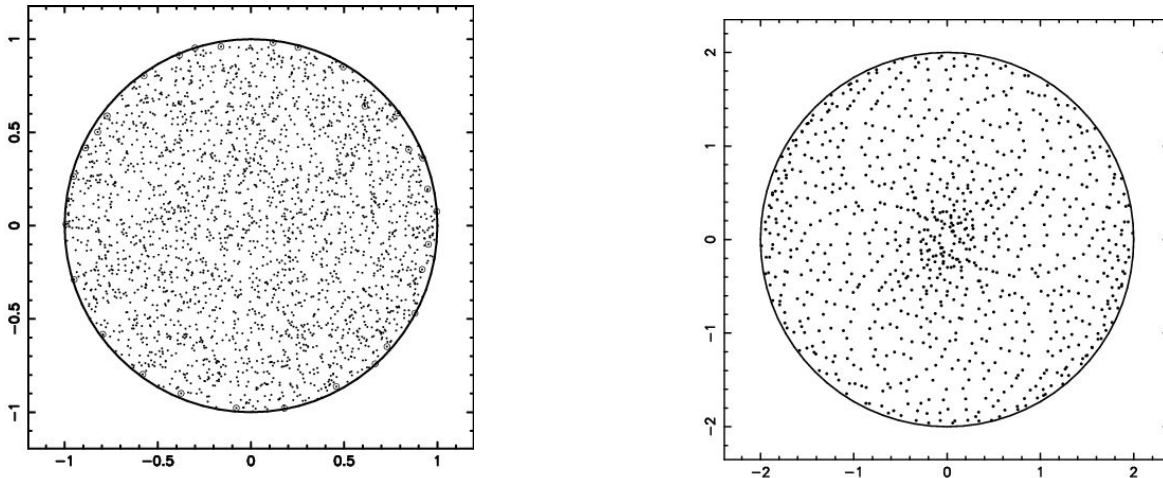


Fig:-4 Comparison of swarm in different data base

### III. CONCLUSION

Both the P&O and Incremental conductance method for maximum power point tracking are described in this paper. Particle Swarm Optimization technique is applied to the clustered of data to find the best possible result. From the optimization it has been concluded that both the algorithm will provide best result if it is controlled by some predefined controller. Here the controller may be a fuzzy controller or may be a microcontroller. More number of research must be carried out in the field of optimization so that it can be applied to the solar cell optimization.

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