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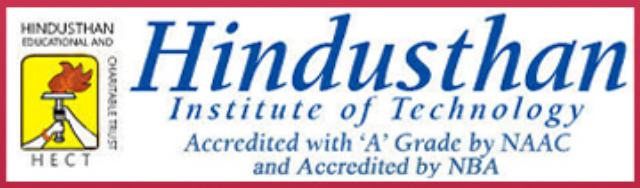

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Voltage Profile Enhancement in a PV connected Hybrid Power system Using Dynamic Voltage Restorer

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***Abstract* – This research focuses on improving the voltage profile in a hybrid power system with a PV connection utilising a dynamic voltage restorer. The goal of this work is to raise the system's power quality. Even if voltage sag and swell occur on both the transmission and distribution sides, the issue is only fixed there. A methodical technique is used, assuming the elements required to develop the system. A dynamic voltage restorer that is connected in series recognizes voltage flickering right away and restores high voltage to its original levels. This model's design successfully resolves the voltage flickering issue as well. MATLAB Simulink is used to simulate the results, which clarified the system's significance.**

Keywords – ***PV, Dynamic Voltage Restorer, Voltage Source Inverter***

I. INTRODUCTION

Photovoltaic (PV) system or solar power systems, are often used to capture solar energy and convert it to electricity. Solar inverters are commonly used to convert DC to AC power. PV systems are environmentally friendly since they produce no pollution and do not consume fossil fuels [1, 2]. The sun as a source of energy is efficient because it does not require a lot of storage space and does not pose any transportation issues. When solar cells are put in touch and are wide open to the light, they can transfer electricity from one end to the other using semiconductor technology. PV panel materials are divided into two types say crystalline and thin film. Crystalline panels are commonly employed in PV panel as they are more efficient than thin films. PV systems can have grid side effects since they employ inverters for conversion, which can inject harmonics into the system, causing a drop in voltage as well as a resonant effect in the system, which can injure the system as well as affect its power quality [3, 4]. Because consumers or residential users prefer to use the load at unity power factor to obtain greater active power while lowering reactive power, the distribution transformer runs at a very low power factor. It can also have a negative impact on functional load. If a grid fault occurs, the grid will get disconnected but the solar system continues to operate, it means the system is still operational, which can damage individuals.

To generate electricity, PV cells are the best substitute compare to hydro power plant to minimise future water shortages [5, 6]. Despite of many flaws and issues, it is one of the most efficient and adaptable ways to capture energy from sunlight without harming the environment and providing the desired output to end users (solar energy). In order to address the poor forecasting accuracy and slow number of iterations of the BP Neural Network, an innovative PV MPPT method based on general enhanced ant colony optimization algorithm-trained BP neural network (OIACO-BPNN) has been presented [7].

II. PV SYSTEM DESCRIPTION

PV cells capture sunlight and conserve the energy in PV system which is typically installed on rooftops or connected to national networks to absorb electricity [8]. There are no losses because the system does not use batteries. Figure 1 shows the PV array block diagram with different converters.

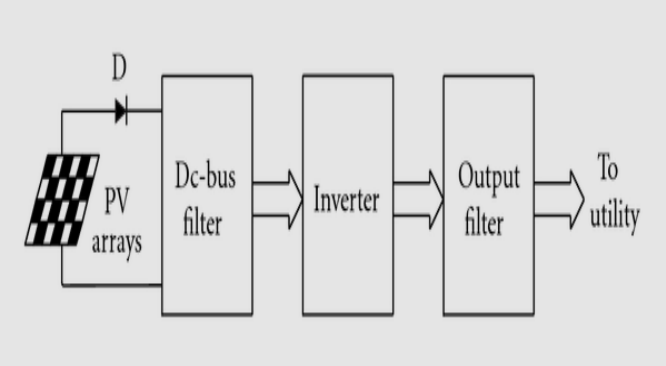

Fig 1: PV array with different converters

In general, there are two major processes in power cell variation. The electron and pair are divided by the gadget's structure, which sends electrons to the negative edge and allows them to enter the positive edge by applying electrical force once the lights have been gathered, resulting in a gap inside the electron pair. Photovoltaic cells use a nonlinear current-voltage equation that is affected by temperature and the sun's rays.