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INTRODUCTION OF ISLANDING, ISLANDING DETECTION METHOD AND DISTRIBUTED GENERATION

Nakrani Keval D*, Shaikh Hidayat I, Baflipara Nikunj P, Prof. Mr. Shani M. Vaidya
* Electrical Engineering, Valia institute of technology, valia, Gujarat.
Electrical Engineering, Valia institute of technology, valia, Gujarat.
Electrical Engineering, Valia institute of technology, valia, Gujarat.
Electrical Engineering, Valia institute of technology, valia, Gujarat.

ABSTRACT

In increasing development of world, the "electricity or electrical power" plays main role. For this delivering the continuous power is necessary. In this paper we will discuss about situation of islanding in which local load disconnected from main grid or micro grid and connected with source of distributed power generation. Distributed generations like PV cells, wind turbines etc. gives the continuous power supply to the load and protect it from the interruption. When load disconnected from grid and connect with DG set, for this some islanding detection methods are used which is active method, passive method and utility based method.

KEYWORDS: Islanding, Islanding detection methods, Distributed power generation.

INTRODUCTION

In recent years concept of micro grid and islanding widely spread. To overcome the difference of demand and supply of electrical power, continuous power supply is necessary. As we know all the electrical distribution system are interconnected, so it gives flexibility of continuous power supply. In case of, when micro-grid or small portion of whole interconnected system is disconnected from utility system then it's called Islanding. In this situation of islanding, it is necessary to supply power to load continuously. So when micro-grid is connected from main grid the load is directly supplied by the Distributed power generation source like PV cells, Fuel cells, Wind Turbines etc. For generation of power economically mainly PV cells and Wind turbines are used due to environment consideration.

The situation of islanding can be distinguished in two types: Intentional Islanding and Non-intentional Islanding. In case of intentional islanding, when the maintenance is necessary for the specific part or portion of micro-grid and it is disconnected from main grid it's called Intentional Islanding. Where in non-intentional islanding, it is not planned to disconnect intentionally but it is disconnect due to any types of fault.

ISLANDING DETECTION METHODS

In this system when micro-grid disconnect from main grid and connect the load with source of distributed generation is happened in milliseconds so, any man power work with electrical system cannot identify the situation of islanding which is hazardous for manpower.So someislanding detection methods are used. Islanding detection methods are divided into (1) Local detection method (2) Remote (central) detection method.

Local detection method

Local detection method is base on the measuring parameter like voltage & frequency;and it is use on the DGside. Local detection method is usually classified the (a) Active method and (b) Passive method.

Active method

Active method is directly in contact with power system operation by introducing small perturbations. It does rise to power quality issue and are not suitable for wind farm. Reactive power export error detection method, impedance

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measurement method, slip mode frequency shift algorithm (SMS), active frequency drift (AFD), active frequency drift with positive feedback (AFDPF), automatic phase shift (APS) & adaptive logic phase shift (ALPS).

Passive method

Passive method is continuously monitoring the parameters of power system like voltage, frequency and harmonics distortion etc. When inthis parameter changes are detect then islanding is occur. Passive method does not affect the waveform of high voltage. It is conducible. So this method does not give rise the power quality issues. Passive method

DISTRIBUTED GENERATION

Now a day due to limitations of conventional energy sources like coal, diesel, petrol and nuclear fuel the use of nonconventional energy sources are increase day by day. Mainly distributed generation is use natural resources like solar energy and wind energy which can generate electrical power in form of DC and it can converted into AC using converter unit. Generation capacity of distributed generation is between 1KW-50MW.

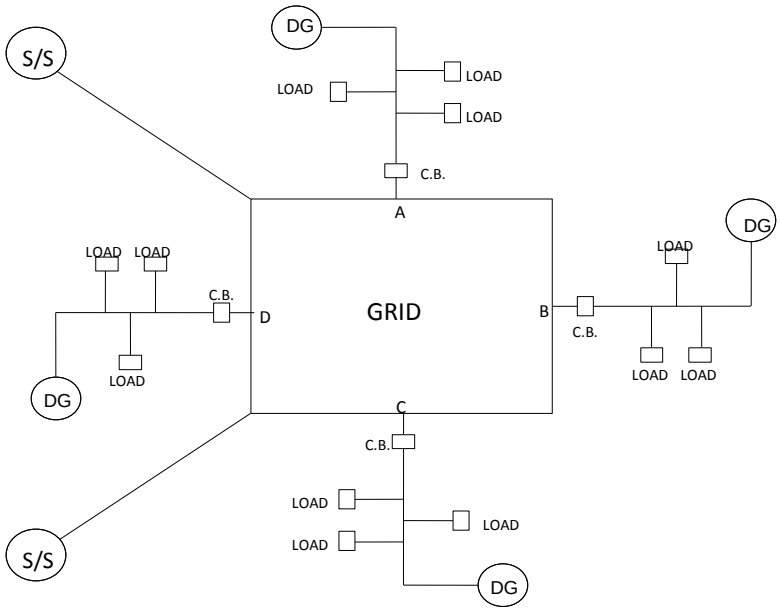

Fig.1. distributed generation system in interconnected system

The best example of solar generation unit is in Gujarat, where the solar panels are installed on the Narmada canal which generate power of 1MW and also it is saves the water vaporisation and generate electricity from solar energy.

CHALLENGES OF DISTRIBUTED POWER GENERATION

With the benefits of distributed power generation sources, there are also some challenges present. In case of solar unit limitations present like sunlight not get continuously and at constant intensity, in cloudy or rainy atmosphere sunlight cannot get for the generation of electricity. In wind power plant, speed of wind generator are depends on the flow or speed of wind. So, renewable energy sources have low generation cost but it cannot generate electricity continuously due to above reasons.

Also there are technical challenges with the interconnection of distributed generator with micro-grid or local load, voltage fluctuations, overvoltage & under voltage and variations in frequency, synchronisation etc.

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SIMULATION WITHOUT CONTROLLING

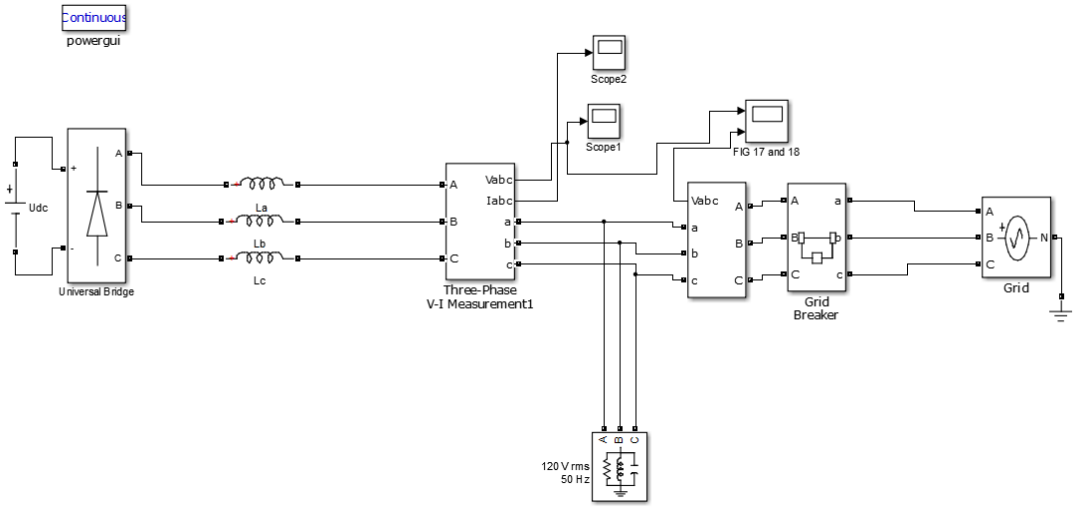

Fig.2. simulation without controlling

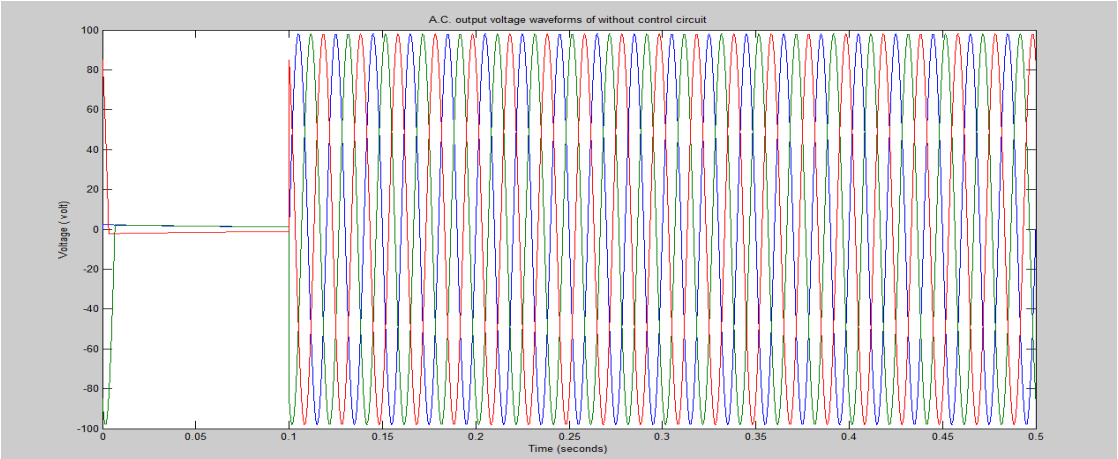

Fig.3. Output waveform of without control circuit

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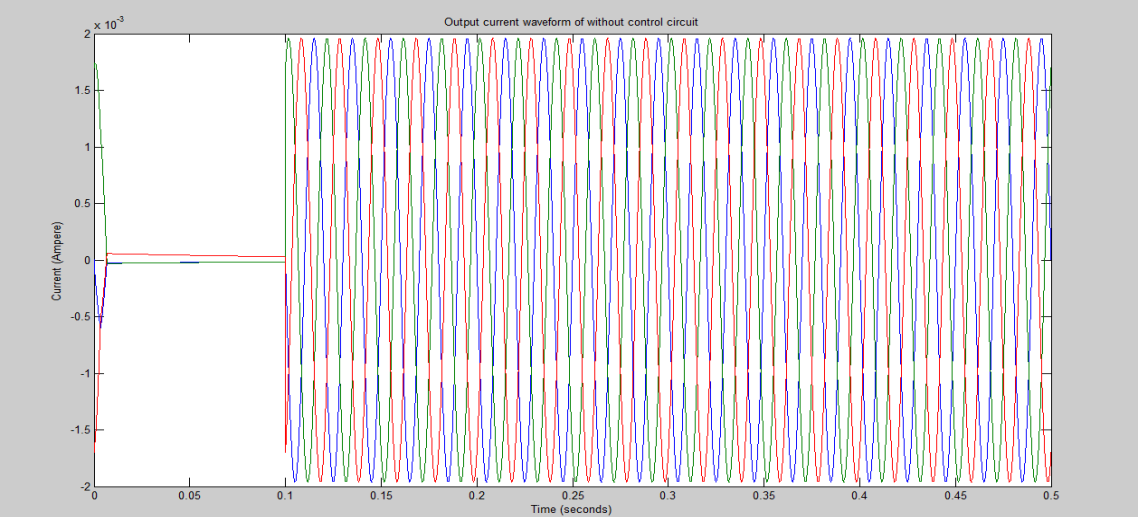

Fig.4. Output current waveform of without control circuit

SIMULATION WITH CONTROLLING

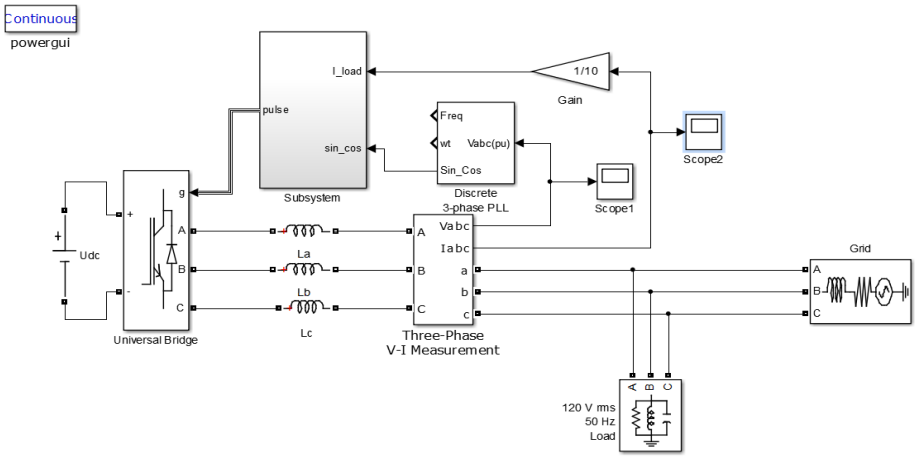

Fig.5. Main circuit with controlling

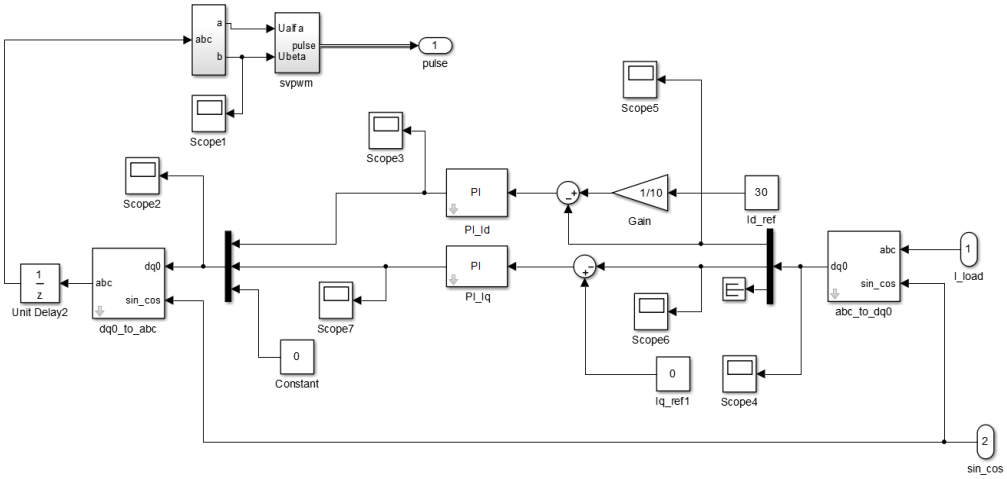

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Fig.6. Subsystem of main circuit

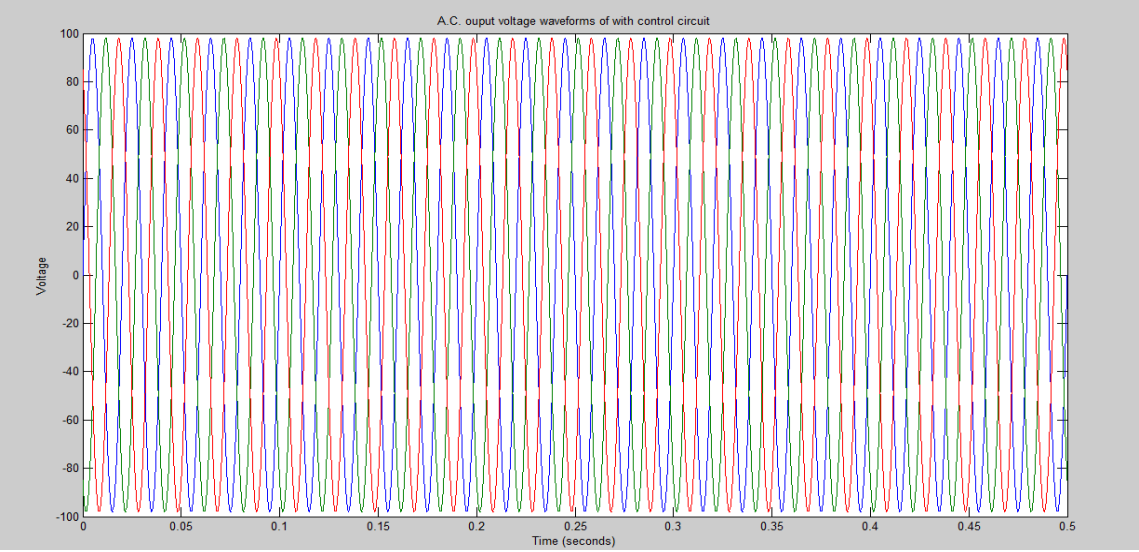

Fig.7. Output voltage waveform of with control circuit

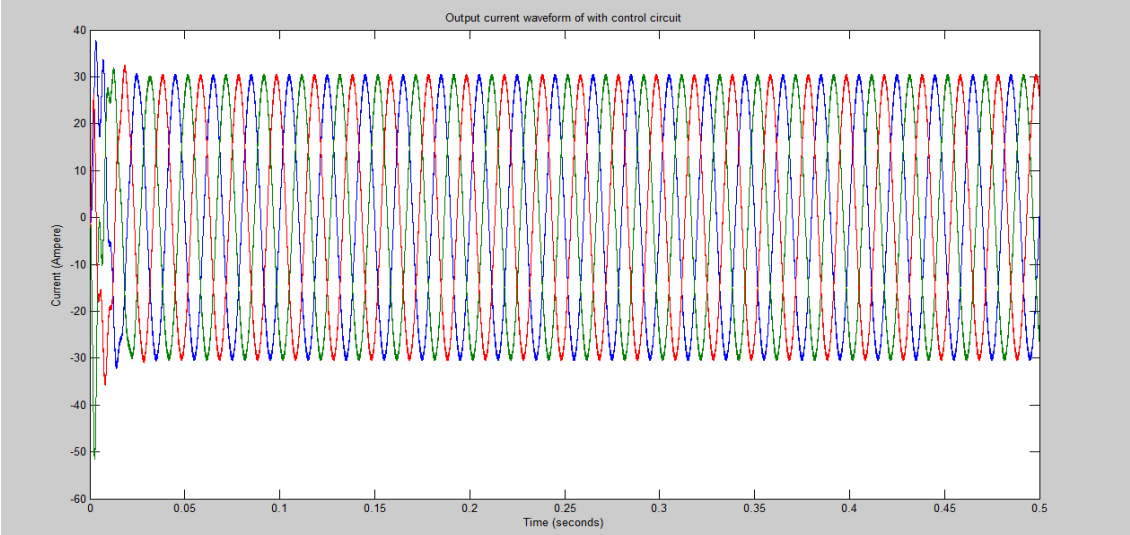

Fig.8. Output current waveform of with control circuit

CONCLUSION

The requirement of power supply is change time to time but the continuity of power supply with stable voltage. Not only stable voltage but it also without fluctuations. Both the circuit without control and with control shows the difference in voltage and current waveforms.

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