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REDUCTION OF LEAKAGE CURRENT IN GRID-CONNECTED PV SYSTEM

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ABSTRACT:

Grid connections in the solar system have resulted in the revolution in the performance of the solar system and opened the doors of several opportunities to support the use of solar systems. The grid connected photovoltaic (PV) power systems are replacing the other systems very rapidly due to the better performance parameters like efficiency there by reducing the space requirement and cost of present systems. The grid connected system always faces the problems related to the safety and the job of the design engineer is to optimize the performance of the system. The decision makers have to work for addressing the issues related to the leakage current in such systems. Authors ha discussed about the performance improvem t by boost inverter inclusion in the conventiona tem. The near state pulse width modulation (NSPW is also included in the scope of this study und MATLAB /SIMULINK environment. The system performance was found impro hence the study is helpful for impr ement the solar systems connected to the g

KEYWORDS: PV– photo volt PWM- lse width modulation, cl-ssbi coupled t sing boost inverter, M- near s pulse width modulation.

INTRODU TION:

Th have found mo uitable than other renewable r ces for electricity g eration. The huge capacity of g ting the electri ty without any pollution is very rtant as for the developing country like India. Th lar systems are occupying the market worldwide very y due to the vital features. The world is in need of ean sources and systems for sustainable development and solar systems fulfill all the requirements of such needs. The main aim of this project is to analyze and model of grid connected PV inverter systems with respect to reduce leakage current phenomenon that can damage solar panel and provide safety related to leakage current problem. New topologies and control strategies that will minimize leakage current reduce the size, cost and exhibit high efficiency is proposed and verified.

SIMULINK MODEL:

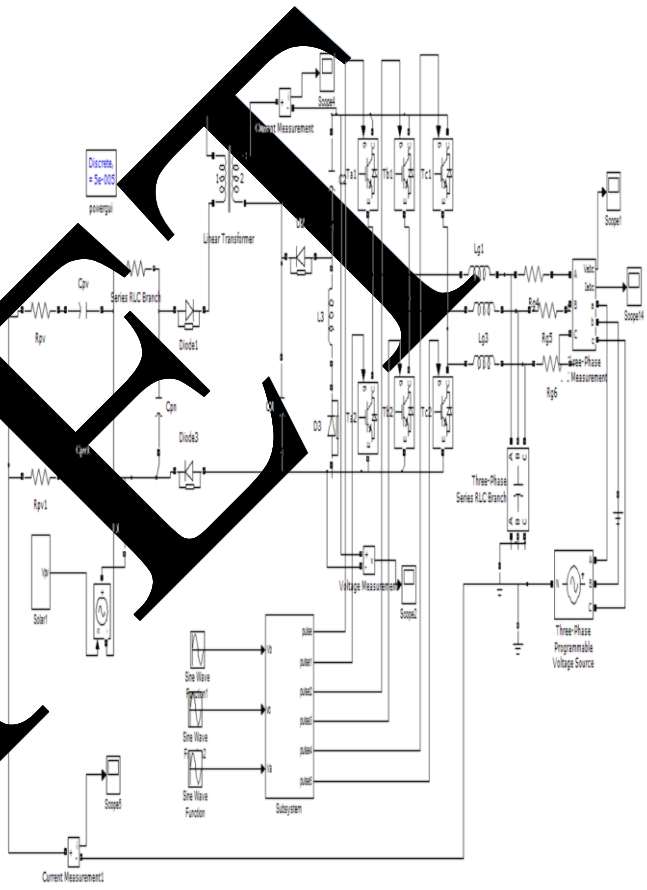

Figure 1: simulation diagram

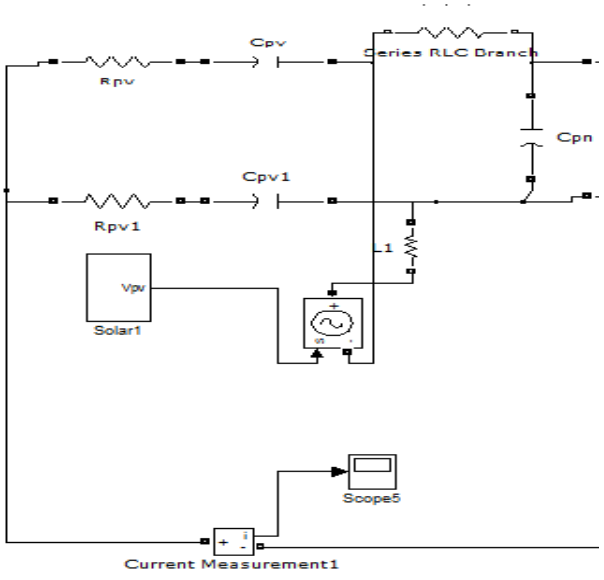

Figure 2: Design of solar panel

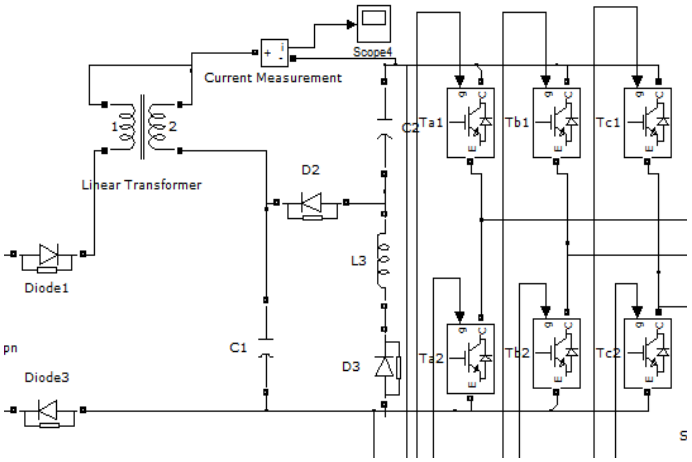

Figure 3: Converter with coupled inverter

RESULTS OF SIMULATION:

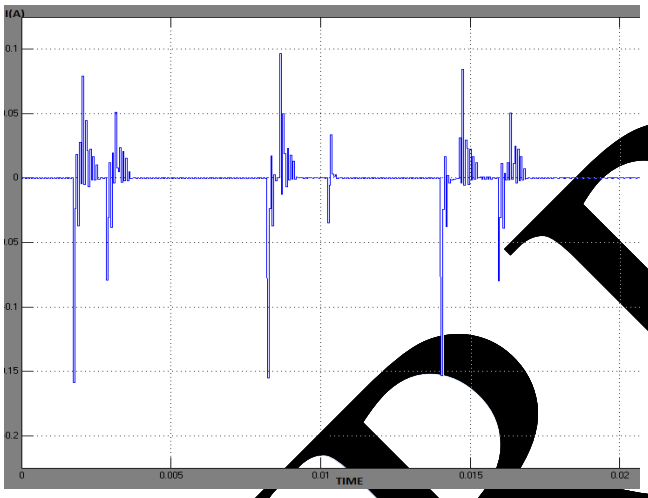

Figure 4:Waveform of leakage current

The leakage current by using conventional pwm method in grid connected PV system is 1 A and by using nspwm method the leakage current is 0.1 A.

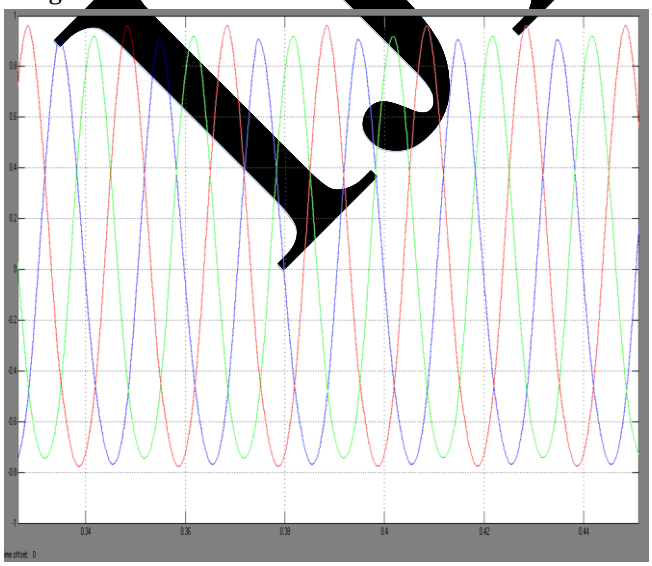

Figure 5: Waveform of output current

The output current of grid connected PV system by using conventional pwm method is 0.2A and by using the nspwm method the output current is 0.9 A.

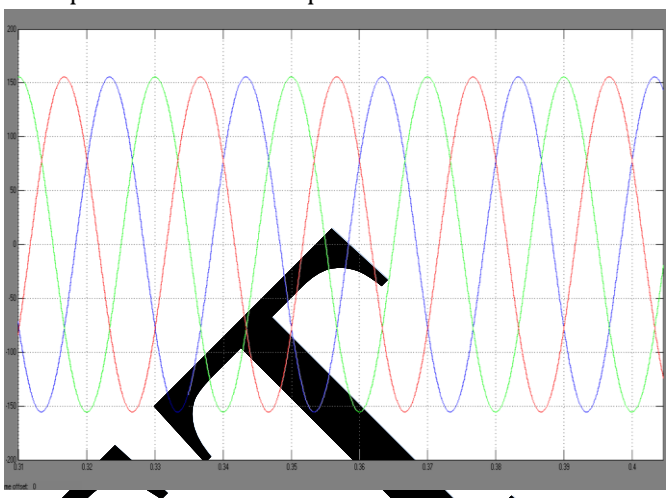

Figure 6: Waveform of output voltage

The output voltage of SIMULATION after applying the PWM technique is 150 V.

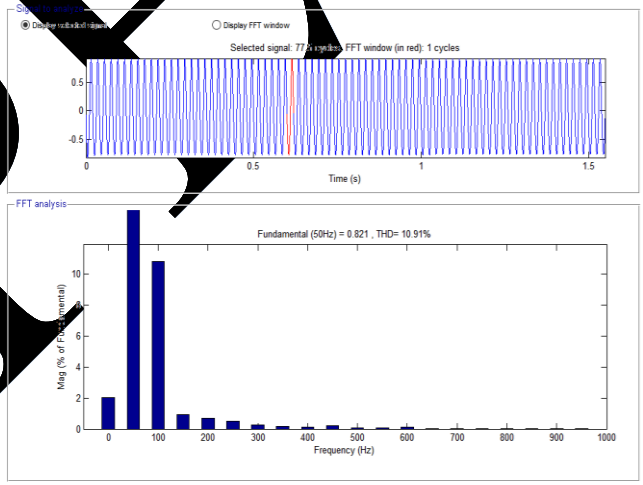

Figure 7: Waveform of THD

The output THD of conventional pwm method is 20.18% is reduced upto 10.91% by using nspwm technique.

CONCLUSION:

This paper has presented the reduction of leakage current in grid connected PV system. Diode D4 is added in the front of topology together with D1 to block the leakage current loop during the circuit operation. The leakage current caused due to the parasitic capacitance is reduced by using NSPWM technique. By using this technique in grid connected PV system, the output THD of the system can be reduced. The switching losses in PWM technique is can be reduced by using NSPWM up to then 33.33%.Also coupled inductor can improve the gain of the output. This is helps in improving efficient grid output. The software tool used in this project is MATLAB 2012b.

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