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1	Himanshu Pandya		A Review of CFD methodology used for solar devices	Advances in Power Generation from Renewable Energy Sources	2017	ISBN- 978-81-932091-2-7	Yes	Innovative Research Publication

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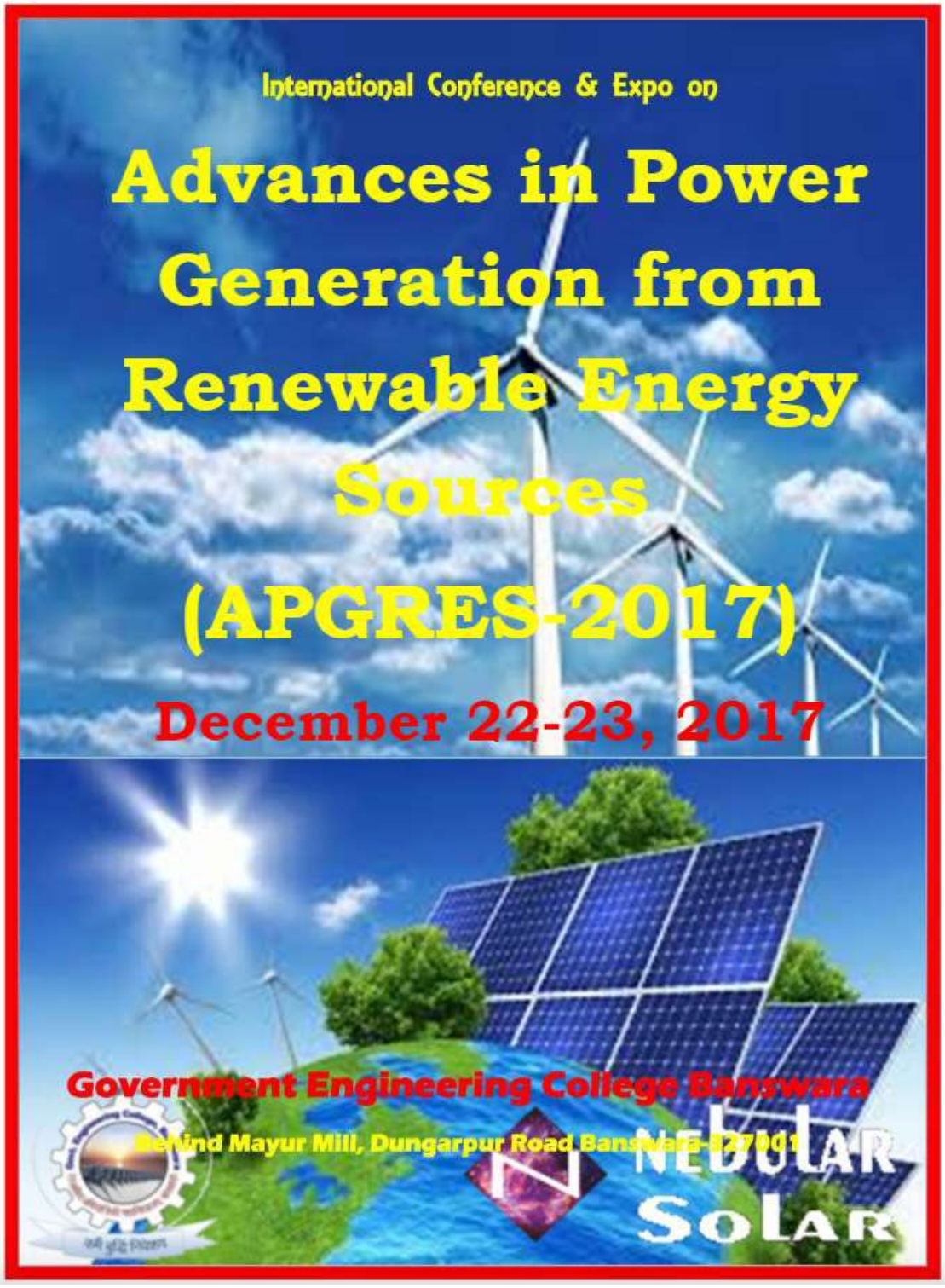

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A Review of CFD Methodology used for Solar Devices

Himanshu Pandya
Dept. of Mechanical Engg, Techno India NJR Institute of Technology, Udaipur, Rajasthan, India
Corresponding Author Email: erhimanshupandya@gmail.com

Abstract

Tremendous need of renewable energy development is very much felt in every part of the globe and sun energy is a prime source of renewable energy, many different techniques and devices are created to harness this vast amount of clean energy source as an alternative to the fossil fuels. Experiments on the physical models and prototypes has been done to create a higher efficiency device but they are time-consuming and costly processes and with the development in the field of computer, scientist and inventors are equipped with the powerful technique of numerical or computational fluid dynamics (CFD) simulation. With the help of numerical or CFD simulation various parameters and effects are check prior to building a physical system with a good accuracy. This article discusses the computational approach used by various researchers in developing various solar systems such as solar water heater, solar air heater and solar still. And also, about the advantages and limitations of the computational approach. In this review it is found out that CFD results are validates with the experimental results and various parametric study can be done more efficiently.CFD is a powerful tool of the analysis of the physical problem.

Keywords: Solar energy, solar water heater, solar air heater, solar still, CFD.

1. Introduction

The sun is a major source of renewable free energy (i.e. solar energy) for our planet Earth. With the modernization new technologies are being employed to generate energy from harvested solar energy. These approaches have already been proven and are widely practiced throughout the globe as renewable alternatives to conventional nonrenewable energy sources [1]. Also use of solar energy for domestic and industrial heating purposes has also increased. With the increase in demand in solar energy due to the following reasons: -

1. Solar energy is free and available for most of the year for the major part of the globe.
2. It is pollution free and also helps in carbon reduction in the world [2].
3. It is Available in abundance such that it can full fill all the world demand if its harvesting and supplying technologies are readily available [3].

It's now a great challenge for engineers, researchers, scientist and inventors to create such devices which can easily and efficiently harness, store, and utilize this immense source of pollution free energy. This required great amount to research has to be done, which is also happing in more advance ways then it was before. The analysis of solar devices was carried out in the literature using three approaches as stated below

1. Experimental
2. Theoretical (mathematical)
3. Computational approach.

In this paper, main objective is to highlight the latest work done in Computational approach for solar devices with brief introduction and comparison with Experimental approach.

2. Methods or approaches for solar devices analysis

A solar device involves the physics of fluid and heat flow. For analyzing the solar devices its thermal and hydraulic performance has to be

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2	Prasun Chakrabarti		Gain and bandwidth modification of microstrip patch antenna using DGS	International Conference on Innovations in Control, Communication & Information Systems	2017	ISBN -978-1-5386-3941-2	No	IEEE Xplore

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POSTER PERSENTATION

Gain and Bandwidth Modification of Microstrip Patch Antenna using DGS

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Abstract – The patch antennas are very popular and useful antennas for small size and solid design for RF uses and Wi-Fi systems. In Wi-Fi, cellular phone call and satellite uses patch antenna switch has magnetized a lot interest because of less dimension, cheap on mass production, less burden, short profile and simple incorporation with other parts. In this paper, a new design of DGS technique is proposed with the patch antenna to modify its parameters. Antenna was designed at 1.9GHz and analyzed later to enhance its parameters and mainly bandwidth and Gain of the antenna, DGS was implemented. The coupling of patch and ground along with the DGS implementation on the ground plane enhanced the bandwidth and gain.

Keywords – Defected ground structure, patch, bandwidth, Gain.

I. INTRODUCTION

The patch behaves like a transducer which contains resonant like cavity having its barriers like short circuit elements on front and back of the substrate. In a confined space or cavity there is only assured forms are permitted to be present, at unusual radiating frequencies. If frequency is applied to the radiator, a powerful ground is set up within cavity and a powerful current on the (base) ground of the patch. This generates important radiation (perfect radiator). This type of radiator are of very low cost and easy to fabricate and possess very large number of qualities. Microstrip patch antenna converts the electromagnetic waved into the electrical signal at the time of receiving and do vice versa at the time of transmission of the signal.Many theories were presented over rectangular microstrip patch antenna and for their parameter improvement. Some of them were use of parasitic elements [1], different feeding techniques [2], metamaterial incorporation [3], and one of the major setback was use of defected ground structure technique [4], it is not only easy to design and cheap in fabrication as well. Not too much calculation required while going through this process.

A single band micro-strip radiator which has photonic band gap structure (PBG) in the surface plane and also discussed the result of PBG to restrain the resonance of radiator at 17 harmonic frequencies was designed and simulated. The experimental study shows that radiation frequencies are drastically diminished when PBG structure is used. Third radiating frequency is repressed at more than 15 dB [5].

A double-polarized MPR which is able to attain a high isolation, small diffident radiation levels, broad bandwidth and small cross-polarization levels was fabricated. The coupling aperture used is H-shaped. It uses stacked aperture coupled micro-strip square patches which is simple to add with active devices and gives wide bandwidth. In this Dissertation return loss has bandwidth of 20.9% and over this bandwidth the isolation is enhanced than 36 dB. Front-to-back ratio and cross-polarization levels are also good [6].

A suggestion in which faulty ground structure is utilized in MPR which will restrain the upper level harmonics. An H shaped defect is cut in the surface plane which convert the radiation of the radiator in a far better radiation pattern. This proposed DGS radiating frequencies at harmonic frequencies correlate to MPR without DGS [7].

DGS is an etched symmetrical or non-symmetrical cascaded configuration defect in ground of a planar transmission line (e.g., microstrip, coplanar and conductor backed coplanar wave guide) which disturbs the shield current distribution in the ground plane cause of the defect in the ground.

II. CALCULATION

A new patch antenna has been proposed for the operating frequency of 1.9 GHz. Parameters were calculated by formulas listed in [8] and then antenna was designed in CST simulation software and the simulation result were analyzed. Designed antenna is shown in figure 1 and then in corresponding figures 2 and 3 simulation result were presented of the antenna designed at 1.9GHz.

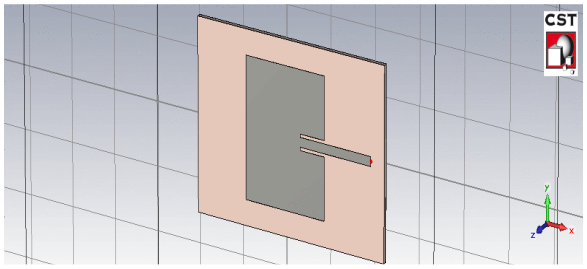

Fig. 1. Designed antenna at 1.9GHz frequency.

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Contribution ID: **396** Type: **Oral**

Different Control Techniques for Active Power Filter for Harmonic Elimination & Power Quality Improvement

Thursday, June 22, 2017 12:00 PM (15 minutes)

Power electronic loads are being connected to the distributed power plants through power electronic converters and these power electronic converters and loads are the source of harmonics and reactive power which affects the performance of the power system network. Switching compensators called Active filters or active power line conditioners brings an effective alternative to the conventional passive LC filters as they can compensate for several harmonic orders, and are unaffected by major changes in network characteristics, avoiding the risk of resonance between the filter and network impedance and are compact and robust compared with traditional passive compensators.
The aim of this work is to design shunt active filter to mitigate and alleviate the harmonics and reactive power issues with controller based on different theories under unbalanced and distorted regimes. In this paper a control method for active power filter using Space Vector Pulse Width Modulation (SVPWM) is compared with other control techniques.

Primary authors: Mr ALI, IRFAN (Techno NJR Institute of Technology); Prof. CHHAWCHHARIA, Pradeep (Techno Njr Institute of Technology, Udaipur, Rajasthan, India)

Presenter: Mr ALI, IRFAN (Techno NJR Institute of Technology)

Session Classification: Oral session 20 - High-Voltage Power Supplies Thermal and Power Conditioning - Session Chair : Christopher Yeckel

Track Classification: High Power Electronics

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CONTROL TECHNIQUES FOR ACTIVE POWER FILTER FOR HARMONIC ELIMINATION & POWER QUALITY IMPROVEMENT

[1]IRFAN ALI, [2]VIRENDRA SHARMA, [3]PRADEEP CHHAWCHHARIA

[1,2]Arya college of Engineering & IT, Jaipur, India, [3]Techno NJR Institute of Technology, Udaipur, India
E-mail: [1]erfanalialvi@gmail.com, [2]vsharmakiran@gmail.com, [3]pradch123@gmail.com

Abstract— Power electronic loads are being connected to the distributed power plants through power electronic converters and these power electronic converters and loads are the source of harmonics and reactive power which affects the performance of the power system network. Switching compensators called Active filters or active power line conditioners brings an effective alternative to the conventional passive LC filters as they can compensate for several harmonic orders, and are unaffected by major changes in network characteristics, avoiding the risk of resonance between the filter and network impedance and are compact and robust compared with traditional passive compensators.

The aim of this work is to design shunt active filter to mitigate and alleviate the harmonics and reactive power issues with controller based on different theories under unbalanced and distorted regimes. In this paper a control method for active power filter using Space Vector Pulse Width Modulation (SVPWM) is compared with other control techniques.

Index Terms— PWM,SVPWM,THD,SAPF,P-Q Theory.

I. INTRODUCTION

The custom of linking the power electronic loads and distributed power plants via power electronic converters is growing day by day. Now these power electronic converters and loads are the sources of harmonics and reactive power which greatly affect the performance of the power system network, as using non-linear, time-varying loads will cause distortion of voltage and current waveforms along with excessive reactive power demand in ac mains. The presence of harmonics in power lines causes major power losses in the distribution system, interference problems in many communication systems and, sometimes, in operation failures of electrical and electronic equipment, which are very sensitive as they include microelectronic control systems, which work with very low energy levels. Because of these problems, the subject of the power quality delivered to the end consumers is, much more than ever, an object of higher concern.The active power filters have become much popular because of excellent performance to diminish the harmonic and reactive power problems.

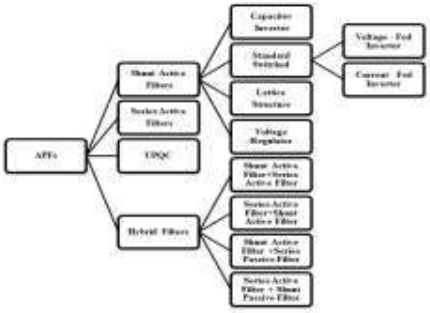

Fig. 1. Classification of active filters based on power circuit, configurations and connections.

In an Active Power Filter (APF) we deploy power electronics which introduces current components to remove harmonic distortions incurred by the non-linear load. Figure 2 shows the basic concept of an active filter. They sense the harmonic components in the line and then produce and inject an opposing and inverting signal of the detected wave in the system. The two main fields of research in active power filters are the control algorithm for current detection and load current analysis method. Active harmonic filters are mostly used for low-voltage networks because it is difficult to match the required rating on power converter [1].

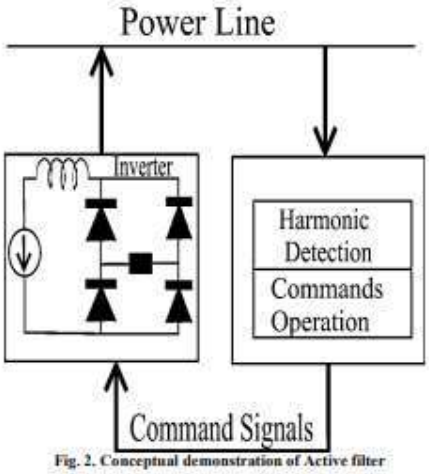

Fig. 2. Conceptual demonstration of Active filter

The performance of the active filters is dependent on the control theory that is used to formulate the control algorithm of the active filter. The controller of the active filter is the heart of the filter which notably affects its performance [2].

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4	Neha Dwivedi, Pradeep Chhawchharia		Power Mitigation in High Performance 32-bit MIPS based CPU on Xilinx FPGAs	2017 IEEE International Conference on Consumer Electronics-Asia (ICCE-Asia 2017)	2017	978-1-5386-2787-7	Yes	IEEE Xplore

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Neha Dwivedi ; Pradeep Chhawcharia **All Authors**

Abstract: The purpose of this work is, to introduce design of a 32-bit MIPS (Million Instruction Per Second) based CPU containing five stages of the pipeline, to incorporate power ... **View more**

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Abstract:
The purpose of this work is, to introduce design of a 32-bit MIPS (Million Instruction Per Second) based CPU containing five stages of the pipeline, to incorporate power optimization techniques for the processor. The functionality of design is verified by writing Verilog Modules on Xilinx 14.5 choosing the target FPGA device. Synthesis and simulation results have been taken from ModelSim 6.2c. Analysis of the design floorplan of 32-bit CPU and study of the detailed netlist has been achieved on PlanAhead tool, which was giving accurate results. From the performance viewpoint, FPGA-based implementation of processor is totally centered on the designing of processor architectures in Verilog HDL and increasing the overall speedup with power mitigation at Spartan class (45nm and 90nm) FPGAs. The significant features of this work are; increased number of instructions, enhanced performance and low power consumption with HDL modification techniques. The design has consumed less than 119mW of power with the maximum frequency of operation at 70.413MHz for Spartan-6. Optimized power observed was about 22.72% after applying power reduction techniques, which make this work useful for low power FPGAs.

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5	Payal Paliwal		Efficient FPGA Implementation architecture of Fast FIR Algorithm using Han-Carlson adder based Vedic multiplier	Inventive Research in Computing Applications	2018	ISBN (e) 978-1-5386-2456-2	Yes	IEEE Xplore

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Payal Paliwal ; Janki Ballabh Sharma **All Authors**

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Abstract:
Parallel FIR filter is the need of many low power and high speed DSP applications. In this paper, fast FIR algorithm based parallel symmetric FIR filter using Han-Carlson adder based vedic multiplier is proposed. FFA algorithm reduces the multiplier count as compared to the traditional parallel design. In order to improve the performance of the proposed filter, recently developed Han-Carlson adder based Vedic multiplier is used. In the proposed design the adder unit is also implemented using Han-Carlson adder. In the proposed design two and three parallel FIR filters of order 24 and 72 are implemented using VHDL. The implementation results show that the proposed architecture provides low critical path delay and power dissipation as compared to the conventional one. With the advantage of low delay and power, proposed architecture is useful in modern signal processing and communication applications.

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Development of Rain Water Harvesting System through National Highway Profiles by Using GIS and Field Survey

Sangeeta Choudhary[a*], Shiva Chouhan[b], Mohit Jain[c], Kamlesh Panchal[d], Yash Bhardwaj[e]

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[bc d e] *Under Graduate Student, Techno India Njr,Plot-SPL-T, Bhamashah(RIICO) Industrial Area, Kaladwas, Udaipur(Raj), India*

Abstract

In last few decades groundwater recharge has reduced and surface water runoff has increased due to increase in built-up areas. Most of the rainwater is wasted due to the runoff in absence of proper water harvesting plan. It is required to develop a technique to harvest rainwater from all possible ways. It is easy to implement the project of rainwater harvesting system on National Highways. Longitudinal as well as cross-sectional slopes of National Highways are already very accurate to channelize the rainwater for harvesting. In this study, an integrated approach for assessing the rainwater harvesting capacity in minimum cost by using GIS and field survey approach for the study area on National Highway 27, Udaipur bypass. In a pilot study of 5 km segment of National Highway 27, it is found that 65 million liters of water can be harnessed for future use by 2000 villagers for about 240 days with per capita consumption of 135 lpcd (litre per capita demand). RS and GIS provide a good opportunity to gain a better understanding of contour pattern, natural and manmade profiles. The result indicates the application of GIS techniques help for conducting detailed field survey for planning the proper drainage system along the highways to store rainwater in the nearest reservoir. The socioeconomic survey was also conducted to select a good insight into the local situation.

Keywords*: Water Runoff; Water Harvesting; National Highway; Longitudinal and sectional Slopes; RS and GIS; Field Survey*

1. Introduction

This project is aimed to develop sustainable drinking water sources by harvesting rainwater using the profiles of national highways (Rockstrom et al. 2002 and Seckler 1996). An attempt is made to elaborate the application of RS and GIS in the field of identification of slopes of national highway and contours of the area for searching the best storage location of harvested rainwater (Chowdary V M et al. 2009). Reconnaissance and semi-detailed field survey were carried out for collecting information required to produce various thematic maps. The integration of remotely sensed data into GIS can be a powerful tool in planning, managing a research work and spatial data analysis to develop a decision making a support system for rainwater harvesting (Zhongping Zhu et al 2004). It is easy to implement the project of rainwater harvesting system on the national highway because longitudinal and cross-sectional slopes of national highways are already very accurate to channelized the rainwater for harvesting. Only a few installations are required to harvest the rainwater. So it will prove very cost-effective technique.

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