

## WatchDog: A Malicious URL Detection System for Social Networks (Twitter)

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**Abstract:** Twitter is vulnerable to malevolent tweets containing URLs for irrelevant, phishing, and malware distribution. Traditional Twitter spam detection schemes utilize account features such as the ratio of tweets containing URLs and the account creation date, or relation features in the Twitter graph. These detection schemes are ineffective against feature creations or use much time and resources. Predictable malicious URL detection schemes utilize several features including lexical features of URLs, URL redirection, HTML content, and active behavior. However, evading techniques such as time-based evasion and crawler evasion exist. In this paper, we propose **WatchDog**, a malicious URL detection system for Twitter. Our system examines correlations of URL redirect chains extracted from several tweets. Because attackers have limited resources and usually reuse them, their URL redirect chains frequently share the same URLs. We develop methods to discover correlated URL redirect chains using the frequently shared URLs and to determine their maliciousness. We collect numerous tweets from the Twitter public timeline and build a statistical classifier using them. Evaluation results show that our classifier accurately and efficiently detects malicious URLs. We also present **WatchDog** as a near real-time system for classifying malicious URLs in the Twitter.

**Keywords:** Redirect chains, Correlation of URLs, feature extraction, Data Collection.

### I. INTRODUCTION

Twitter is a famous social networking and information sharing service that allows users to exchange messages of fewer than 140-character, also known as tweets, with their friends. When Twitter users want to share a URL with friends via tweets, they usually use URL shortening services to reduce the URL length since tweets can contain only a restricted number of characters. Owing to the popularity of Twitter, malicious users often try to find a way to attack it. The most common forms of Web attacks, including spam, scam, phishing, and malware distribution attacks, have also appeared on Twitter. To cope with malicious tweets, several Twitter spam detection schemes have been proposed. These schemes can be classified into account feature-based, relation

feature-based, and message feature-based schemes. Account feature-based schemes use the distinguishing features of spam accounts such as the ratio of tweets containing URLs, the account creation date, and the number of followers and friends. The relation feature-based schemes rely on more robust features that malicious users cannot easily fabricate such as the distance and connectivity apparent in the Twitter graph. Extracting these relation features from a Twitter graph, however, requires a significant amount of time and resources as a Twitter graph is tremendous in size. The message feature-based scheme focused on the lexical features of messages.

In this paper, we propose WatchDog, a malicious URL detection system for Twitter. Instead of investigating the landing pages of individual URLs in each tweet, which may not be successfully fetched, we considered correlations of URL redirect chains extracted from a number of tweets. Because attacker's resources are generally limited and need to be reused, their URL redirect chains usually share the same URLs. Therefore we created a method to detect correlated URL redirect chains using such frequently shared URLs. By analyzing the correlated URL redirect chains and their tweet context information, we discover several features that can be used to classify malicious URLs. We collected a large number of tweets from the Twitter public timeline and trained a statistical classifier using the discovered features. The trained classifier is shown to be accurate and has low false positives and negatives.

### II. PROPOSED SYSTEM

Our goal is to develop a malicious URL detection system for Twitter that is robust enough to protect against conditional redirections. Consider a simple example of conditional redirections (Fig.1), in which an attacker creates a long URL redirect chain using a public URL shortening service as well as the attacker's own private redirection servers used to redirect visitors to a malicious landing page. The attacker then uploads a tweet including the initial URL of the redirect chain to Twitter. Later, when a user or a crawler visits the initial URL, he or she will be redirected to an entry point of the intermediate URLs that are associated with private redirection servers. Some of these redirection servers check whether the current visitor is a normal browser or a crawler. If the current visitor seems to be a normal browser, the servers redirect the visitor to a

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# FPGA IMPLEMENTATION OF MULTIPLIER USING SHIFT AND ADD TECHNIQUE

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**Abstract** - Multipliers are one of the most important parts in signal processing or other computationally intensive applications. Therefore, designing multipliers that are high speed, low power and less area of substantial research interest. Many attempts have been made to reduce the number of partial products generated by multiplication process. The aim of this paper is to Implement a Multiplier block using shift and Add technique of multiplication in an FPGA. The implementation is done by using Xilinx 14.5 version of VHDL with the targeted device of Spartan 3E. The performance of Multiplier unit is evaluated for various parallel prefix adder variants, which are developed for high speed addition. The experimental results shows that the implemented Multiplier using hybrid parallel prefix adder is efficient in area, consume low power and high speed compared to existing parallel prefix adder models.

**Keywords** - Multiplier, Shift and Add, Field Programmable Gate Array (FPGA), Digital Signal Processing (DSP), Parallel Prefix Adder (PPA).

## I. INTRODUCTION

In many digital signal processing operations – such as correlations, convolution, filtering and frequency analysis – one needs to perform multiplication. Multiplication algorithms will be used to illustrate methods of designing different cells so that they fit into larger structures[2]. Multiplication is a fundamental operation in most signal processing algorithms. Multipliers have large area, long latency and consume considerable power. Therefore low power multiplier design has been an important part in low power VLSI system design [4]. There has been extensive work on low power multipliers at technology, physical, circuit and logic levels. A systems performance is generally determined by the performance of the multiplier because the multiplier is generally the slowest element in the system. Furthermore, it is generally the most area consuming. Hence optimizing the speed and area of the multiplier is a major design issue. However area and speed are usually conflicting constraints so that improving speed results mostly in large areas. As a result a whole spectrum of multipliers with different area-speed constraints has been designed with fully parallel structures [5-7].

The rest of the paper is organized as follows: In section II, some background information about the process of multiplication and various types of multipliers are given. In section III, multiplication using shift and add technique is discussed. The section IV describes various parallel prefix adder architectures and their implementation. Experimental results are presented in section V. conclusions and Future scope are drawn in section VI.

## II. BACK GROUND

The multiplication process may be viewed to consist of the following two steps: 1. Evaluation of partial

products, 2. Accumulation of the Shifted partial product. It should be noted that binary multiplication is equivalent to a logical AND operation. Thus evaluation of partial products consists of the logical ANDING of the multiplicand and the relevant multiplier bit. Each column of partial products must then be added and, if necessary, any carry values passed to the next column [2]. Multiplication schemes are commonly classified in three general types: sequential, parallel and array multipliers. This is not a universal classification and some hybrid multiplication schemes do not fall into exactly are of these categories. For example, as a compromise between sequential and parallel multipliers, partially combinational multiplier, are introduced to achieve higher performance but still keep the hardware small [12].

Sequential multipliers generate the partial products sequentially and add each newly generated partial product to the previously accumulated sum. The sequential multipliers were popular when the hardware was expensive and bulky. They are still in use in applications where the speed is not critical. Shift and Add multiplication is an example of sequential multiplier [11]. The parallel multipliers generate all partial products in parallel and then use fast multi-operand adders for their accumulation [12]. Array multipliers are essentially regular structures and are similar to expand. In array multiplication, we need to add as many partial products as there are multiplier bits [5].

Wallace tree multiplier is considerably faster than a simple array multiplier. The Wallace tree's wiring is much less regular and more complicated. As a result, Wallace Trees are often avoided by designers, while design complexity is a concern to them. Wallace tree styles are generally avoided for low power applications[4,5]. Booth multiplier can be used in different modes such as radix-2, radix-4, radix-8, etc. modified Booth is most often used to avoid variable

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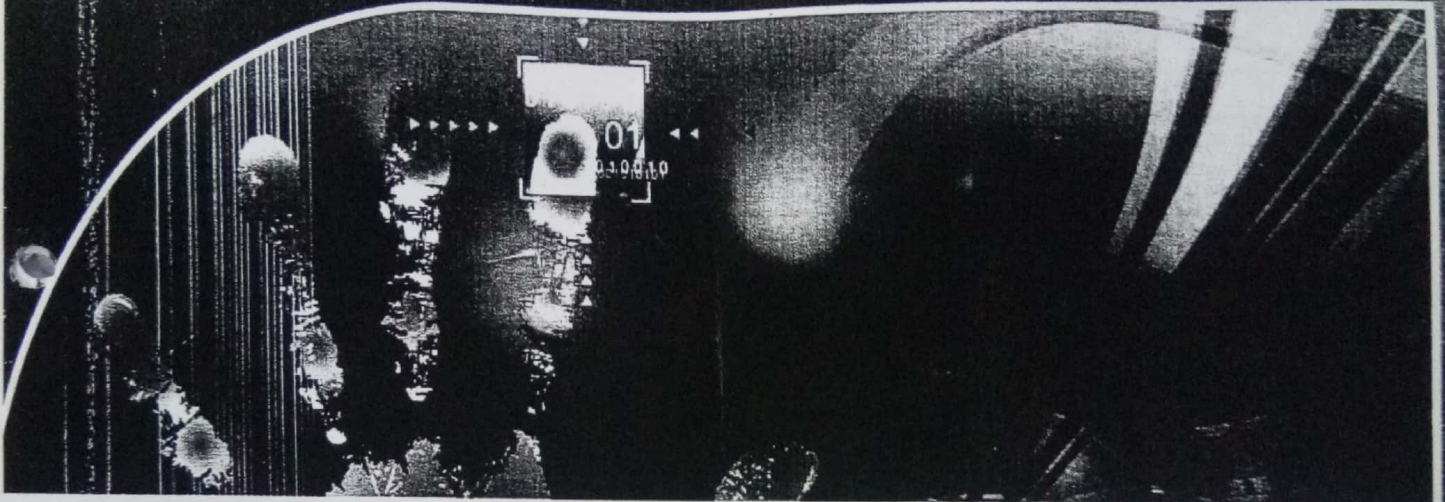
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# ENERGY RECOVERY CMOS FLIP-FLOPS FOR LOW POWER APPLICATIONS

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## ABSTRACT

The CMOS VLSI Design Technology is getting miniaturized day-to-day, the power management, delay control and effective area utilization are the most crucial aspects need to be considered in the design of highly synchronous systems.

The clock distribution networks in synchronous digital IC's distribute the clock signal which acts as a timing reference that controls the flow of data within the system. The clock signals are heavily loaded and will have the highest capacitance, which will operate at high speed. Hence, the clock distribution network consumes a large amount of power in highly synchronous systems.

The total power is due to three components: Flip-flop power, clock power, and the clock generator power. Flip-flop power represents the power dissipated on the internal nodes of the flip-flops. The clock-tree power is due to the energy dissipated on the resistances of the wires in the clock-tree. Clock generator power is due to dissipation of resonant clock generator circuitry and inverter buffer chain.

This paper is aimed to implement various energy recovery CMOS Flip-flops, SAER, SDER, DCCER, and SCCER. These flip-flops are simulated using PSPICE software and the performance of these energy recovery flip-flops are compared with the conventional square-wave clock flip-flops. These flip-flops are simulated at an operating frequency of 100

MHz, at an operating voltage of 1.8V. The simulation results shows that significant amount of power is reduced when compared with the non-energy recovery flip-flops.

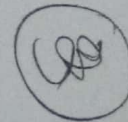
## Keywords

Flip-Flop, Energy Recovery, clock-tree, SAFF, SAER, SDER, DCCER, SCCER.

## 1. INTRODUCTION

The Present day VLSI Technology comprises of synchronous Digital Integrated Circuits. These synchronous Digital Integrated Circuits comprises of clock distributed networks which distribute the clock signal to all other devices in the system. Due to this clock distribution network major fraction of total power in synchronous digital system is dissipated over the clock distribution network [1]. This is because the clock signals are heavily loaded, high capacitive and operates at high speeds. The clock distribution network distributes the clock signals which acts as a timing reference for the inputs and control the flow of data within the system [2].

Experiments show that the power consumption in high performance processors is about 30%-50% of total system power, which is spent over the clock distribution network [3]. Also, the clock distribution network is driven by a central clock unit called clock generator. Ultimately, all the Flip Flops are driven by the clock signals. So, the major fraction of total power is due to three components





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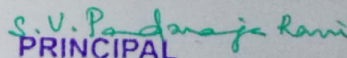
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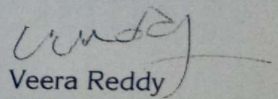
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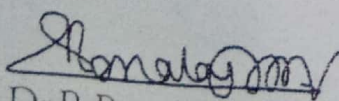
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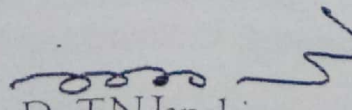
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# PV-FC Hybrid System with Multilevel Boost Converter Fed Multilevel Inverter with Enhanced Performance

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**Abstract-** This paper presents a multilevel boost converter fed multilevel inverter for hybrid solar PV-FC systems. Previously conventional boost converters were used to step up the voltage obtained from sources. But recently these are replaced by different high step-up Boost Converters which can produce much higher output voltage than that of conventional boost converters (BC). But all these high step-up boost converters are meant for only particular output voltage. But in this present system a multilevel boost Converter (MLBC) is used which can step-up to any voltage just by adding capacitors and diodes. The power source consists of photo voltaic generator and PEM Fuel cell. Modified P&O MPPT algorithm is used to extract the maximum power from PV system. Both boost converters fed multilevel inverter and multi level boost converter fed multi level inverter systems are modeled, simulated and their results are compared. Simulation results indicate that MLBC system produces higher output power than normal BC system based MLI for the same input voltage from PV & FC sources and load resistance.

**Keywords:** PV cell, PEM fuel cell, MPPT, Multilevel boost converter

## I. INTRODUCTION

India is one of the quickly developing nations as far as energy utilization. Right now, it is the fifth biggest consumer of energy on the planet and will become the third biggest by 2030 [1]. The nation is heavily dependent on fossil sources of energy for most of its demand. In response to present scenario of energy consumption, India is slowly concentrating towards renewable energy resources. Currently demand for electricity is increasing very rapidly so to reduce the gap between demand and supply, India has focused 20GW of Solar Power by 2022. Most of the energy is in the form of light and heat, which can be gathered and utilized for generating electricity. Photovoltaic (PV) cells are large-area semiconductors that convert daylight into electricity. PV systems turn into an extremely appealing arrangement because of the energy crisis and environment issues such as pollution and global warming effect. The foremost challenge in harvesting of solar energy is that the PV panel is a variable power source. This is the prime challenge in integrating them with grid or using them as standalone systems. It is theoretically known that temperature, humidity, wind speed, air pressure, air temperature, solar collector area etc. influence the outcome in terms of performance. MPPT algorithms are very much needed in PV applications because the power extracted from a typical solar panel varies with the insolation and temperature. Hence we need to use MPPT algorithms to obtain the maximum power

from a solar PV array. In this paper, modified P&O MPPT algorithm is used for PV system to track maximum power. Also PEM Fuel cell is used as another source. Most of the research works used conventional boost converters for step up the voltage obtained from the sources but here Multi level Boost converters [2] are used to step-up the voltage obtained from the sources. Comparison of BC and MLBC based multilevel inverter for hybrid PV-FC system is done.

The rest of the sections are organized as follows: in section II the description about the present and proposed systems are explained and is followed by a detailed explanation about modeling of PV cell in section III. PEMFC is explained in section IV, P&O MPPT algorithm is explained in section V, Multi level boost converter explanation is given in section VI. Asymmetrical Hybrid MLI is discussed in Section VII followed by results in section VIII. Conclusions and references are provided in section IX and section X respectively

## II. SYTEM DESCRIPTION

The block diagram of the existing SBC-MLI system is illustrated in Fig. 1. The output of PV cell & Fuel Cell are stepped up using boost converters. The outputs are applied to the seven level Asymmetrical Hybrid multilevel inverter systems.

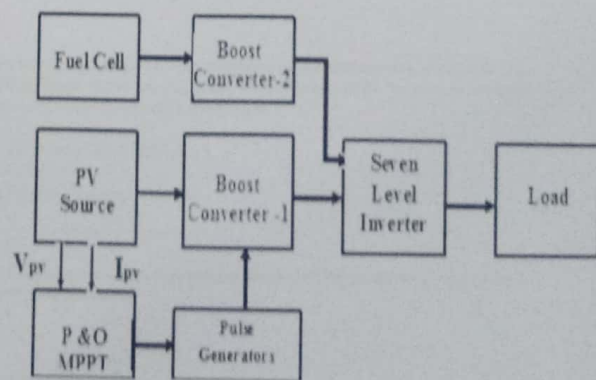
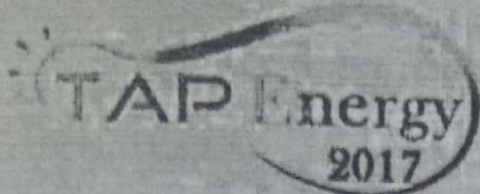


Fig 1. Block diagram of existing BC-MLI system

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9

# Red luminescence from $\text{Eu}^{3+}$ -doped $\text{TeO}_2\text{-WO}_3\text{-GeO}_2$ glasses for solid state lasers

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Abstract.  $\text{Eu}^{3+}$ -doped oxyfluoro tellurite (TWGEu) glasses were prepared by conventional melt quenching method. The optical band gap energy and covalence between  $\text{Eu}^{3+}$  and  $\text{O}^{2-}$  F ions were determined from optical absorption spectra. Using the  ${}^3\text{D}_0 \rightarrow {}^7\text{F}_{1,2,4}$  emission transitions, the  $\Omega_2$  and  $\Omega_4$  intensity parameters were determined. These intensity parameters were used to evaluate the radiative parameters such as emission probability rate (A<sub>r</sub>), luminescence branching ratio (β<sub>r</sub>) and radiative life time (τ<sub>r</sub>) of  ${}^3\text{D}_0 \rightarrow {}^7\text{F}_1$  transitions. The laser characteristic parameters such as stimulated emission cross-section, gain bandwidth and quantum efficiency were determined. The luminescence decay profiles of  ${}^3\text{D}_0$  emission level were well fitted to single exponential function for all the concentrations. The experimental results show that the 0.5 mol% of  $\text{Eu}^{3+}$ -doped TWGEu glass could be the best choice to design red laser sources.

## INTRODUCTION

The study of spectroscopic and luminescence properties of different trivalent rare earth (RE) ions doped multi-component glasses play an important role in fabricating various photonic devices such as solid state lasers, fiber amplifiers, imaging sensors, display monitors, data storage devices, scintillators etc [1-3]. The fabricated materials should have longer lifetimes, sharp absorption and emission peaks and different excited levels appropriate for optical pumping. Among the available glass hosts, the oxyfluoro tellurite based glasses are suitable host materials to incorporate different RE and/or transition metal ions owing to their excellent luminescent properties, low phonon energy, high refractive index, high transparency in the mid infrared region and moisture resistant stability [4,5]. The narrow band emission, relatively simple energy level system and transition selection rules of  $\text{Eu}^{3+}$  ion facilitate to probe the cation sites in different host materials [6,7]. When doped into glass hosts the characteristic line spectrum of  $\text{Eu}^{3+}$  suffers extensive inhomogeneous broadening owing to superposition of emissions from many sub sets of sites in glass. The non-degenerate nature of  ${}^7\text{F}_0$  ground and  ${}^3\text{D}_0$  excited states of  $\text{Eu}^{3+}$  ions have been used to investigate the symmetry and in-homogeneity of any host matrix. Moreover, the  $\text{Eu}^{3+}$  ions has been used as an efficient activator for rich red colour as they emit intense red luminescence through  ${}^3\text{D}_0 \rightarrow {}^7\text{F}_2$  transition [8-10].

In this work we prepared different concentrations of  $\text{Eu}^{3+}$  ions doped oxyfluoro tellurite glasses and characterized through optical absorption, photoluminescence (PL) excitation, emission and luminescence decay. The Judd-Ofelt (J-O) parameters [11,12] were determined using the  ${}^3\text{D}_0 \rightarrow {}^7\text{F}_{1,2,4}$  emission transitions. The analysis of emission of red luminescence through  ${}^3\text{D}_0 \rightarrow {}^7\text{F}_2$  transition and luminescence decay of  ${}^3\text{D}_0$  emission level was discussed in detail.



# Control of Asymmetrical CHB multilevel inverter using Fractional order PI controller

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**Abstract-** This paper presents analysis and comparison of open loop and closed loop operation of asymmetrical cascaded H-Bridge multilevel inverter. The present study consider a 7-level asymmetrical cascaded H-Bridge multi level inverter. There exist many modulation methods for multi level inverter in which the bipolar carrier based level shifted phase disposition pulse width modulation technique is used in this present work. Here a closed loop provided to maintain the constant output voltage (230V r.m.s). Also a comparison analysis is carried out for asymmetrical multi level inverter with open loop as well as closed loop using PI controller and fractional order PI controller. The simulation study demonstrates the merits of asymmetrical multi level inverter with closed loop fractional order PI controller over conventional PI controller and also proves the effectiveness of closed loop FO-PI controller in providing an output voltage with reduced distortions. The simulation was carried out using MATLAB/Simulink.

**Keywords:** Asymmetrical Multi level inverter, Level shifted PWM technique, PI controller, Fractional order PI controller, THD

## I. INTRODUCTION

A multilevel inverter is a power electronic device which is capable of providing desired alternating voltage level at the output using multiple lower level DC voltages as an input. Multi-level inverters are broadly utilized as a part of high power applications because of its momentous merits over customary two level inverters, for example low switching losses, better electromagnetic capability, and lower harmonics. Comparing two-level inverter topologies at the same power ratings, MLIs additionally have the favorable circumstances that the harmonic components of line-to-line voltages connected to load are decreased owing to its switching frequencies. The quality of the output voltage is improved as the number of voltage levels increases, so the quantity of output filters can be decreased. Plenty of multi level inverters are proposed however, still most popular MLI configurations are Neutral point clamped MLI, flying capacitor MLI, Cascaded H-Bridge MLI (CHBMLI). Among all the above mentioned inverters Cascaded H-Bridge multi level inverters are mainly focused in most of the researches especially dealing renewable energy sources like Photovoltaic and Fuel cell, because, the cascaded inverter has the least components for a given number of levels. Cascade multilevel inverters comprises of a progression of H-bridge cells, to synthesize a desired voltage from several separate DC sources which might be acquired from PV cells, batteries or fuel cells. All these features of cascade inverters allow using various pulse width

modulation (PWM) strategies to control the inverter accurately. Cascaded H-Bridge MLI's are of two types symmetrical and asymmetrical topologies. Unlike symmetrical MLI, the asymmetrical MLI structure involves unequal DC sources. The Asymmetrical CMLI topology for a 7 level output voltage is shown in Fig.1.

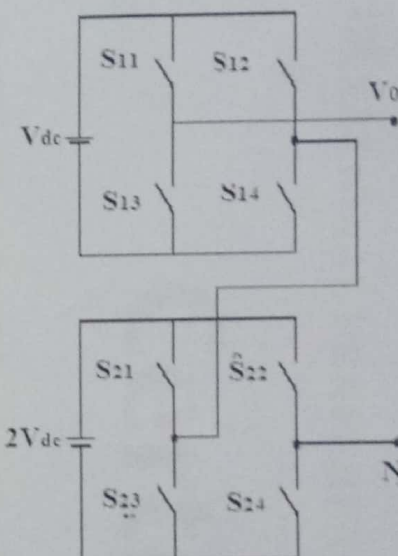


Fig.1. Seven level Asymmetrical CHBMLI.

There are various modulation strategies for providing pulses to the switches of multi-level inverters. An efficient approach to control the asymmetrical MLI is multi carrier PWM technique in which the high frequency carrier wave (triangular) is compared with low frequency reference wave (sinusoidal). Multi carrier modulation is realized with two techniques namely phase shifted and level shifted techniques. Again level shifted modulation is divided into phase disposition (PD), Phase opposition disposition (POD), and Alternate phase opposition disposition (APOD). This paper presents performances of asymmetrical CHBMLI topology with level shifted phase disposition multi carrier PWM technique. Also, comparison of performances of the system in open loop as well as in closed loop with PI controller and fractional order PI controller was carried out. The rest of the paper is organized as follows: in section II the description about asymmetrical CHBMLI was done, and is followed by

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International Conference on  
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25<sup>th</sup> & 26<sup>th</sup> MAY 2018

## CERTIFICATE OF PARTICIPATION

Presented by Mr. Anil Kumar V

of Pondicherry Engineering College

for the paper titled

Control of Asymmetrical CHB Multilevel Inverter Using

Fractional order PI Controller

Co-Author(s)

Arounassalame M

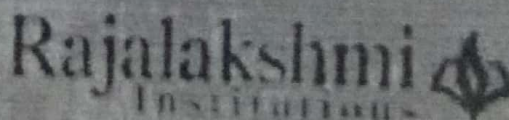
at the International Conference on Power, Energy, Signals and Automation (ICPESA'18) held during 25<sup>th</sup> and 26<sup>th</sup> May 2018 organized by the Department of Electrical and Electronics Engineering, Rajalakshmi Institute of Technology, Kuthambakkam, Chennai - 600 124.

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# Comparison of CHB Multi level inverters using Level shifted Modulation techniques with closed loop PI control

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**Abstract-** This paper presents analysis and comparison of symmetrical and asymmetrical cascaded H-Bridge multi-level inverters. The present study considers inverters with 7 levels at the output. There exist many modulation methods for multi level inverter in which the bipolar carrier based level shifted pulse width modulation technique is used in this present work. Also a comparison analysis is carried out for symmetrical and asymmetrical multi level inverter with open loop as well as closed loop using PI controller. The simulation was carried out using MATLAB/Simulink. The simulation study demonstrates the merits of asymmetrical multi level inverter over symmetrical multi level inverter and also proves the effectiveness of closed loop PI controller in providing an output voltage with reduced distortions.

**Keywords:** Asymmetrical Multi level inverter, Level shifted PWM technique, PI controller, THD

## I. INTRODUCTION

Multi-level inverters are broadly utilized as a part of high power applications because of its momentous merits over customary two level inverters, for example low switching losses, better electromagnetic capability, and lower harmonics. Comparing two-level inverter topologies at the same power ratings, MLIs additionally have the favorable circumstances that the harmonic components of line-to-line voltages connected to load are decreased owing to its switching frequencies. Plenty of multi level inverters are proposed however, still most popular MLI configurations are Neutral point clamped MLI, flying capacitor MLI, Cascaded H-Bridge MLI (CHBMLI). Among all the above mentioned inverters Cascaded H-Bridge multi level inverters are mainly preferred in most of the researches especially dealing non conventional energy sources like Photovoltaic and Fuel cell. because, the cascaded inverter has the least components for a given number of levels. Cascade multilevel inverters consists of a series of H-bridge cells to synthesize a desired voltage from several separate DC sources which might be acquired from PV cells, batteries or fuel cells. All these features of cascade inverters allow using various pulse width modulation (PWM) strategies to control the inverter accurately. Cascaded H-Bridge MLI's are of two types symmetrical and asymmetrical topologies. Unlike symmetrical MLI, the asymmetrical MLI structure involves unequal DC sources. The symmetrical CMLI and asymmetrical CMLI topologies for a 7 level output voltage are shown in fig.1.

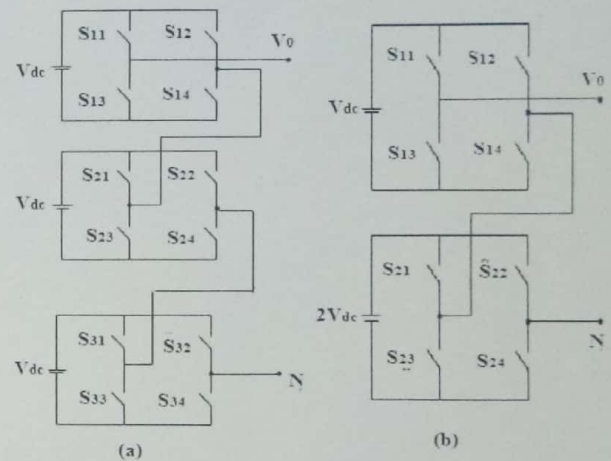


Fig.1.Seven level CHBMLI topologies (a) Symmetrical  
b) Asymmetrical.

There are various modulation strategies for providing pulses to the switches of multi-level inverters. An efficient approach to control the asymmetrical MLI is multi carrier PWM technique in which the high frequency carrier wave (triangular) is compared with low frequency reference wave (sinusoidal). Multi carrier modulation is realized with two techniques namely phase shifted and level shifted techniques. Again level shifted modulation is divided into phase disposition (PD), Phase opposition disposition (POD), and Alternate phase opposition disposition (APOD). This paper presents comparison of performances of symmetrical and asymmetrical CHBMLI topologies with level shifted multi carrier PWM techniques. Also, comparison of performances of the system in open loop as well as in closed loop with PI controller was carried out.

The rest of the paper is organized as follows: in section II the description about symmetrical and asymmetrical CHBMLI was done and is followed by the explanation of control scheme in section III. Voltage controller explanation is given in section IV and simulation results are given in section V. Finally, conclusions are given in section VI.



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## Effect of Magnetic Water on strength properties of concrete

N. N. Kuran Kumar<sup>1</sup>, A. Ravithiraj<sup>2</sup>, G. Vinod Kumar<sup>3</sup>

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<sup>3</sup> G. Vinod Kumar, Assistant professor, Nagole Institute of Technology and Science, Hyderabad, Telangana, India

**Abstract** This research investigates the effect of magnetic water (also known as magnetic field treated water (MFTW)) on the strength properties for the samples prepared with magnetic water. MFTW was obtained by passing through a magnetic field. Test variables included the magnetic strength of water and curing age. The purpose of the present study is to investigate the effect of magnetized water for different days (1 day (24 hours), 2 days (48 hours), 3 days (72 hours) and 4 days (96 hours)). Results show that the compressive strength of concrete samples mixed with magnetic water is higher than those prepared with normal tap water.

**Keyword** : Flyash, MFC-Magnetized Water Concrete, ABC-Normal Water Concrete, Nano silica, Workability

### 1. Introduction

Water is an vital ingredient of concrete as it participates actively in the chemical reaction with cement. It oversees the hydration of cement, workability, microstructure, strength and overall durability of concrete. Water used for manufacturing as well as curing of concrete should be clean and free from oils, alkalis, salts, organic materials and any substance that effects the properties of concrete. Generally potable water is used for creating the concrete researcher Nan Su [1] has concluded that the impact of exploitation magnetic water on the mechanical properties of concrete containing granulated blast -furnace slag that resulted in increase in the compressive strength of concrete up to 23% and also the reason behind the rising the characteristics of concrete is that the directional grouping of the molecular structure when the treatment of water. The magnetized charged treated water could save the cement dose up to 5% and also diminish in the bleeding of concrete and improve the resistance to freezing. Saddam Ahmed [2] had investigated the influence of magnetized water on the mechanical properties of concrete and he conclude that by using magnetized water in concrete the compressive strength of concrete will increase by 10 to 20 percent when the magnetic field density was around 1.2 Tesla. Adnan Flayih Hassan [3] studied the significance of magnetized water on the initial and final setting time, consistency and compressive strength of cement mortars cubes at very ages of 1 and 7 day. The results shown that the using of magnetized water in cement mortar increases the compressive strength and initial, final setting time of cement mortar gets decreased. Results also shown that the optimum water/cement ratio for obtaining the best compressive strength under the conditions of this study was 0.45. Afshin [4] conducted tests to study the improving of the mechanical properties of high strength concrete by magnetic water technology and concluded that the compressive strength of the concrete made with magnetized water was up to 18% more than those of the control concrete sample. The slump values of the concrete made with magnetized water were up to 45% greater than the slump values of the control mixes. Ali Faris [5], researcher examined the features of fresh and hardened concrete for different mixes prepared with magnetized water (MW). MW was prepared by passing the normal water through devices of different magnetic strengths 6000 and 9000 gauss at same velocity.

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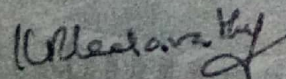
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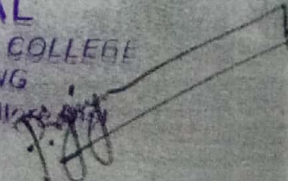
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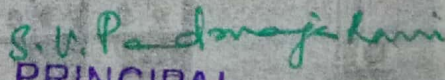
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## A Study on the Effect of Nano silica and GGBS on the Compressive strength of Fly Ash Based Geopolymers

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**ABSTRACT :** The role of reactive alumina and process variables such as sodium content and molarity on alkaline activation of different Nano silica and GGBS are explored. Reactive alumina content of a fly ash is the key parameter which determines the maximum compressive strength achieved from the alkaline activation. In this paper, Effects of the incorporation of nano-silica in fly ash based geopolymer binders have been investigated. Low-calcium fly ash was used as the principal source of aluminosilicate and it was blended with blast furnace slag in small percentages in order to accelerate the curing at room temperature. Colloidal Nano-silica was added at different rates to the total binder on the 3, 7 and 28 day compressive strengths.

**Keyword:** Fly ash, GGBS, Colloidal Nano silica, Ambient Curing, Compressive strength

### 1. Introduction

Geopolymers are aluminosilicate binders made using materials that are rich in alumina and silica. The typical aluminosilicate source materials used to develop the geopolymers are such as blast-furnace slag, metakaolin, ricehuskash, Aluminium rich waste, red mud and flyash [1-7]. In the Asian sub-continent flyash, which is an industrial waste product is the most attractive source material due to its ready availability in large quantities. The quality of flyash which is typically available is however of low grade with little reactive content [8]. Several factors such as reactive oxide contents, particle size, NaOH concentration, temperature, alkali activator to binder ratio and oxide ratios of  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ , and  $\text{Na}_2\text{O}$  influence the [6,9,10].

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# Effect of Nano-Silica and GGBS on the Strength Properties of Fly Ash-Based Geopolymers



A. Ravitheja and N. L. N. Kiran Kumar

**Abstract** In this study, the roles of reactive alumina and process variables such as sodium content and molarity on the alkaline activation of nano-silica and ground-granulated blast-furnace slag are explored. Reactive alumina content of fly ash is the key parameter that determines the maximum compressive strength achieved from the alkaline activation. This paper also investigated the role played by nano-silica in fly ash-based geopolymer binders. The principal source of aluminosilicate is low-calcium fly ash, which was slowly blended with blast furnace slag to accelerate curing at ambient temperature. Then, different rates of colloidal nano-silica were added to the total binder on the days 3, 7, and 28 of curing.

**Keywords** Fly ash · GGBS · Colloidal nano-silica · Ambient curing  
Strength properties

## 1 Introduction

Geopolymers are aluminosilicate binders made using materials rich in alumina and silica. The typical materials used include blast furnace slag, metakaolin, rice husk ash, aluminum-rich waste, fly ash, and red mud [1–7]. In the Asian sub-continent, fly ash, an industrial waste product, is one of the most attractive source materials due to its large availability. However, the quality of this highly available fly ash is of low grade with little reactive content [8]. Several factors influence the mechanical properties and microstructure of fly ash-based geopolymers. Some of these factors include reactive oxide contents, NaOH concentration, particle size, temperature, oxide ratios of  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ , and  $\text{Na}_2\text{O}$ , and alkali activator to binder

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# FPGA Implementation of the Trigonometric Functions Using the CORDIC Algorithm

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**Abstract**—The paper presents the design principle and FPGA implementation of various trigonometric functions such as Sine, Cosine, Exponential, Inverse Exponential, Arc Tangent, Logarithm, and Polar to Rectangular conversion using the standard coordinate rotation digital computer (CORDIC) algorithm. Traditions implementation of these functions on a FPGA consumes a lot of area and the results of these functions are floating point which is difficult to design. Hence CORDIC algorithm with IEEE 32 bit floating point representation is used in this paper for implementation. CORDIC is an iterative algorithm which can perform the complex functions using the shift and add approach. The serial and pipelined CORDIC architectures configured on a Cyclone IV E Device are compared in terms of Area, Delay, and Power dissipation. Serial CORDIC architecture design has low area whereas; pipeline CORDIC architecture has low latency. It finds the application in graphic processors, digital synchronizer, Real time image processing, and scientific calculators and so on.

**Keywords**— CORDIC, Trigonometric function, Exponential, ArcTangent, Logarithm, and Polar to Rectangular conversion.

## I. INTRODUCTION

In 1959, Jack E. Volder introduced the Co-ordinate Rotation Digital Computer algorithm abbreviated as CORDIC. The general equation for vector rotation was used for design of CORDIC algorithm. The CORDIC uses the basic shift and add operations with the help of lookup table for computing the complex trigonometric and arithmetic functions [1]. CORDIC operates in either vector mode or rotation mode was used calculating the sine, cosine, magnitude, phase, hyperbolic functions, exponential, logarithmic, polar to rectangular conversion etc.

In the rotation mode, the old coordinate points are shifted to the new coordinate position based on the angle of rotation. In the vectoring mode, the magnitude and the angular argument of the original vector are computed based on the coordinate components of the input vector [2]. The algorithm finds its applications in various fields such as numerical processors, radar signal processing, scientific calculators, modulation schemes, wireless communications, software defined radio, image and video processing algorithms.

For implementing the trigonometric functions, polynomial approximation and lookup table methods were employed earlier. The lookup table method stores the values for every angle and the output latency is very low nearly one clock cycle. The major disadvantage of this method is the requirement of huge memory. The method has a tradeoff between the accuracy and memory requirement. The polynomial approximation method has high accuracy, but it requires huge hardware [4]. The CORDIC method overcomes the memory requirement problem at the expense of the output latency. The accuracy of the method can be improved by improving the output latency.

## II. REVIEW OF THE CORDIC ALGORITHM

CORDIC algorithm is derived from the basic rotation transform equation as shown in 1 and 2 [3, 8].

$$x_{new} = x_{old} \cos \theta - y_{old} \sin \theta \quad (1)$$

$$y_{new} = y_{old} \cos \theta + x_{old} \sin \theta \quad (2)$$

The above stated equations can be rewritten as shown in 3 and 4

$$x_{new} = \cos \theta [x_{old} - y_{old} \tan \theta] \quad (3)$$

$$y_{new} = \cos \theta [y_{old} + x_{old} \tan \theta] \quad (4)$$

TABLE I. REFERENCE LUT WITH PREDEFINED ANGLES

Iteration(i)	$2^{-i}$	Angle
1.	1	45
2.	0.5	26.5
3.	0.25	14.03
4.	0.125	7.125
5.	0.0625	3.576
6.	0.03125	1.7899
7.	0.015625	0.895
8.	0.007812	0.4476
9.	0.003906	0.2238
10.	0.001953	0.1119

The major challenge in the design of the CORDIC is, it should be multiplier free design. The rotation angle  $\tan \theta$  is restricted to the integer multiples of 2, so that it can be implemented using simple shift operations. The standard angles ( $\theta = \text{atan}(2^{-i})$ ) and their corresponding values are computed and a lookup table (LUT) is maintained as tabulated in Table 1. Any arbitrary angle can be achieved by using the sum or difference combination of the reference angles in the LUT.

The iterative rotation can be expressed in terms of simple addition and shifting operation as shown in 5, 6 and 7.

$$x_{i+1} = K [x_i - (y_i * d_i * 2^{-i})] \quad (5)$$

$$y_{i+1} = K [y_i + (x_i * d_i * 2^{-i})] \quad (6)$$

$$z_{i+1} = z_i - (d_i * \tan^{-1} 2^{-i}) \quad (7)$$

Where  $i$  is the iteration

$d_i$  is the direction of rotation at  $i^{\text{th}}$  iteration

$K$  is the approximation constant which is equal to  $\sum_{i=1}^n \cos(\tan^{-1}(2^{-i}))$

The coefficient constant approaches to 0.6073 as the iteration count approaches to a larger value. The rotation algorithm starts with a gain of  $1/K$  which is equal to 1.647 [5].

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# Critical Review on Privacy and Security Issues in Data Mining

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**Abstract.** In the present day research of data mining the security and privacy issues plays an important role in protecting the data. Data mining is the procedure that derives, categorize and evaluates the effectiveness and suitability of the data from vast datasets given by numerous sources leading to privacy and security issues. This paper reviews various data mining methods used to identify the privacy, security threats and investigates their usage and limitations. The critical review on problems faced in denial of service, distributed denial of service, malware, botnet, spyware, probing and ransomware have been thoroughly discussed and analyzed using data mining techniques.

**Keywords:** Data Mining, Security, Privacy, Algorithm, Data Set.

## 1 Introduction

The dawn of information processing and retrieval in various fields of science and technology has lead the researchers to work on data mining to more extent. The pre-processed data, which is very bulky amount of data, is stored in different formats like archives, forms, pictures, voice recording, videos, technical data and various new data formats. [1]-[3].

In the present day communications, which is, rapidly developing with 4G+ capability in transmitting and receiving data, there is always risk of privacy and security threat in terms of destruction of network, unidentified access to data and data modification. The loopholes in the network causes hackers to break into the network and steal the data. The attackers create proxy switch in the network and can steal money from banks by altering the transactions and customers personal data. The hackers can send falsified information over network and can destruct the services by various attacks which leads to network breakdown.[4]-[6].

The flow of data mining starts with data provider providing the required data and forwarded to data collector, which is stored in database. Using different data mining algorithms the required data is pruned and forwarded to decision maker. The resulted data is structured and useful as shown in Figure 1. For combating the various attacks

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2<sup>nd</sup> International Conference on  
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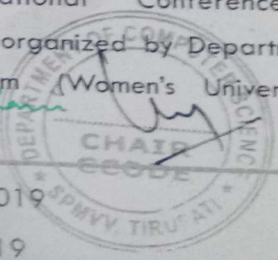
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# Architecture of proposed Secured Crypto-Hybrid Algorithm (SCHA) for Security and Privacy issues in Data Mining

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**Abstract.** Nowadays there is a lot of urge for security everywhere due to various attacks over internet. Researchers try to find solutions but there are new exploits going on time to time. This research provides security and privacy solutions for data mining using Secured crypto hybrid algorithm. The proposed algorithm combines traditional algorithms such as K-means clustering and Local outlier algorithm combined with AES 256 key encryption method on data sets for security analysis.

**Keywords:** Data set, Algorithm, Cryptography, Data mining.

## 1 Introduction

Data mining is the domain of science, which deals with the relationship of patterns inside data and provide useful data to the end users [1]-[3]. Over the vast developments in data science technology protecting the data is the topmost criteria. With the growing prospects in data mining has resulted in vulnerabilities in the present day network communications. Hackers try to find new methods to exploit the data thereby causing heavy losses to the industry. According to the statistical report of USA, around the globe every day some crores of pages are being compromised and data is being leaked.[4].

The major attacks in data mining are denial of service, distributed denial of service, malware, botnet, spyware, probing and ransomware as shown in Fig 1. DOS stands for Denial of Service. It is a type of attack used by hackers to attack the network thereby stopping the services to the users. [5]. DDoS stands for Distributed Denial of Service. It is a type of attack where hackers try to attack a network server from multiple domains thereby creating havoc to the network resulting in collapse of the network. [6]. Malware stands for any type of software code designed to damage the computer which can be a server or a network. It can be introduced in the form of executable code and scripts. [7].

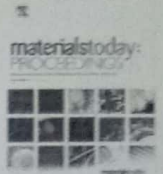
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# A study on the effect of nano clay and GGBS on the strength properties of fly ash based geopolymers

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## ABSTRACT

The role of reactive alumina and process variables such as sodium content and molarity on alkaline activation of different Nano clay and GGBS are explored. The reactive alumina content of fly ash is the key parameter which determines the maximum compressive strength achieved from the alkaline activation. In this paper, Effects of the incorporation of nano-clay in fly ash based geopolymer binders have been investigated. Low-calcium fly ash was used as the principal source of aluminosilicate and it was blended with blast furnace slag in small percentages in order to accelerate the curing at room temperature. Nano-clay was added at different rates to the total binder on the 3, 7 and 28 day of curing.

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## 1. Introduction

Geopolymers are aluminosilicate binders made using materials that are rich in alumina and silica. The typical aluminosilicate source materials used to develop the geopolymers are such as blast-furnace slag, metakaolin, rice husk ash, Aluminium waste, redmud and flyash [1–7]. In the Asian sub-continent flyash, which is an industrial waste product is the most attractive source material due to its ready availability in large quantities. The quality of flyash which is typically available is however of low grade with little reactive content [8]. Several factors such as reactive oxide contents, particle size, NaOH concentration, temperature, alkali activator to binder ratio and oxide ratios of SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, and Na<sub>2</sub>O influence the microstructure and mechanical properties of flyash based geopolymers [6,9,10]. SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>/Na<sub>2</sub>O ratios are the dominant factors in strength prediction of geopolymers. Compressive strength increases with increasing concentration of NaOH in the activating solution [11]. The quantity of NaOH required depends on the type of flyash [12]. Geopolymers tends to be less stable at low SiO<sub>2</sub>/Na<sub>2</sub>O than at high SiO<sub>2</sub>/Na<sub>2</sub>O [9]. The highest compressive strength is obtained at the ratio of SiO<sub>2</sub>/Na<sub>2</sub>O is 0.69 [13]. Increasing the Al<sub>2</sub>O<sub>3</sub>/Na<sub>2</sub>O and SiO<sub>2</sub>/Na<sub>2</sub>O weight ratios in the activating solution influence the compressive strength

[11,14]. The strength of the geopolymers depends on the vitreous portion of SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> ratio [15].

Most commonly used activators are combinations of sodium hydroxide (NaOH) and sodium silicate (Na<sub>2</sub>SiO<sub>3</sub>). The solution ratios derived from results of a flash with high reactive silica content would not require additional Na<sub>2</sub>SiO<sub>3</sub> for achieving high strength. Few researchers considered a vitreous portion of the SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> [15]. Solutions would have to be developed considering the composition and the reactive silica and alumina contents of flash. The current paper explores the role of Nano Clay content on the strength development of geopolymers. An experimental study is conducted on geopolymer concrete by the addition of different proportions of Nano clay cured at room temperature were studied.

## 2. Materials

Although geopolymer concrete can be made using various source materials, the present study used Flyash, GGBS as the primary source of materials. Also, the aggregates occupy 75–80% of the total mass of Geopolymer concrete. The concentration of sodium hydroxide was maintained at 12 M while the concentration of sodium silicate solution containing Na<sub>2</sub>O of 16.37%, SiO<sub>2</sub> of 34.35% and H<sub>2</sub>O of 49.72% is used as alkaline activator solutions. The following sections discuss constituent materials used for manufacturing GPC. The Physical and Chemical properties of the constituent materials are shown in Table 1 and Table 2.

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