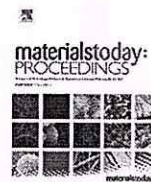




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Study on mechanical behaviour of natural fiber reinforced vinylester hybrid composites

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Natural fiber
Banana and jute fibers
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ABSTRACT

The aim of the present work is to synthesis and evaluates the mechanical behaviour of natural fiber reinforced vinylester hybrid composite using the banana and jute fibers with different stacking sequences. The natural fibres were chemically treated with 10% of sodium hydroxide (NaOH). The natural hybrid composite was fabricated by a vacuum infusion process. The mechanical behaviour was evaluated by tensile test, flexural test and impact test. The structural morphologies were evaluated by scanning electron microscope. The experimental results were revealed that the stacking sequences of natural fibers were influences the mechanical properties of natural hybrid composites. The Jute fiber reinforced composites were provided more tensile strength compared the banana fiber. The mechanical strength of banana higher than the jute fiber reinforced natural composites.

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1. Introduction

The rapid development of newly emerging natural reinforced hybrid polymer composites are found to have numerous applications in the engineering field such as automobile, defence, railway, furniture industry and civil engineering [1,2]. The hybrid natural composites are made by mixing of two or more similar or dissimilar fiber reinforcement in polymer matrix. The manufacturing techniques are selected depends upon the types of a polymer matrix, orientation and types of fibers [3]. The hybrid polymer composites are manufactured using various techniques such as hand lay-up, vacuum bag molding, vacuum infusion, resin transfer molding, vacuum infusion and pultrusion. The hand lay-up process mostly used because of the fast curing and fabricate the complex shape of components, but its exhibits the disadvantages of low efficiency, poor reproducibility and difficulty in quality control. However, the vacuum infusion technique has drawn much attention recently in many industries owing to low cost, simple technique and reduction or elimination of styrene emissions [4].

Natural fiber reinforced polymer composites are categorized into the synthetic and the natural fiber reinforced polymer composites. The synthetic fibers are glass, carbon, basalt and Kevlar dispersed in a polymer matrix. The synthetic fibers are replaced by the natural fibers recently due to synthetic fibers are partially

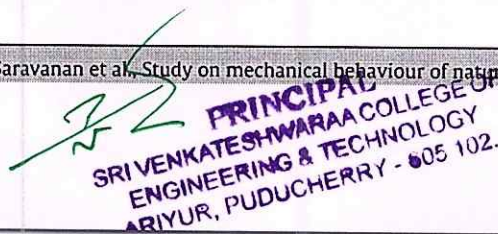
biodegradable, pollute the surroundings and high cost. The natural fiber reinforced composites have gain tremendous popularity in many applications due to the biodegradable, good dimensional stability, high strength, good [5] and low density of natural fiber (1.3 g/cm^3) compare to the synthetic fiber (2.5 g/cm^3) leading to better stiffness to weight ratio [6,7] and natural fibers composites have better sound absorption competence [8]. The examples of natural fibers are coconut, banana, wool, coir, jute, flax, hemp, cotton, kenaf, abaca, ramie, silk, pineapple fibers [9,10]. However, the natural fiber has some drawbacks owing to the presence of Cellulose, hemicellulose, pectin, and lignin in fibers. The presence of cellulose, hemicellulose are improves the moisture absorption capacity in the fibers thus leads to reduced interfacial bonding and it's degrade the mechanical properties of natural polymer composites [11]. The interface strength mainly depends on the bonding between matrix and reinforcement [12,13]. Some of physical and chemical treatments are used to improve functionality of natural fibers and modified the surface of fibers. The chemical treatments are mostly used to alter the surface conditions of natural fibers and some chemical compounds act as coupling agent to make strong interface bond between matrix and reinforcement, decrease the moisture absorption capacity such as silane, acetic acid, sodium hydroxide, acrylic acid, maleated coupling agents, isocyanates, potassium permanganate, peroxide, etc. The alkalization method used as physical treatment of natural fibers. This method is improves the mechanical properties of fibers and it leads better interlock with polymer matrix [14,15].

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Investigation on the Impact of Supply Voltage in Subthreshold Leakage Mitigation

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Abstract—Subthreshold leakage is the significant power squandering leakage component and boosts up the static power consumption. A novel circuit-level subthreshold leakage reduction technique, called as Short-pulse POWER Gated Approach (SPOGA) is proposed. The SPOGA substantially reduces the subthreshold leakage and provides good leakage savings at the sleep state of combinational circuits. Nevertheless, the power management of low duty cycle applications involves in the reduction of dynamic power with supply voltage scaling, which impacts the behavior of short channel transistors of the circuit. Also, the technology scaling reduces the supply voltage, which influences the short channel effects (SCE) and consequently increases the subthreshold leakage. So, the performance analysis of the SPOGA for the reduction in subthreshold leakage with changes in supply voltage is to be done. Hence, the paper aims at performing the analysis of subthreshold leakage reduction at three supply voltages: 1V, 800mV and 600mV. The logic gates and arithmetic circuits are designed using Cadence GPDK090 Virtuoso Schematic and simulation is carried out using Cadence Spectre. The SPOGA provides excellent leakage reduction with supply voltage variations and there by substantially reduces the static power consumption of the circuits

Keywords— Subthreshold leakage reduction; supply voltage; Cadence; low power

I. INTRODUCTION (HEADING 1)

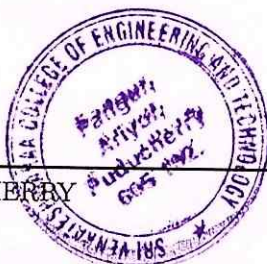
According to International Technological Roadmap for Semiconductors (ITRS), controlling of subthreshold leakage current is the long-term (2021-2028) challenging issue of Process Integration, Devices and Structures (PIDS) in front-end process [3]. The subthreshold leakage current I_{sub_leak} is the current, which flows between drain D and source S of the transistor with the gate-to-source voltage V_{gs} less than the threshold voltage V_{th} . The significant consumption of the subthreshold leakage at sleep state of the circuit ends up in a great power squandering of the static power [1]. In the real-time low duty cycle applications, the exploitation of duty cycling approach reduces the overall power consumption of the circuits by placing them in sleep state [6]. However, the contribution of subthreshold leakage is unavoidable at sleep

state. The investigation has been done on the impact of duty cycling on subthreshold leakage [12]. The result is clearly proven that the subthreshold leakage is increased with the reduction in duty cycle. So, the design of a subthreshold leakage reduction technique is necessary to reduce the increasing subthreshold leakage at the sleep state. In the context of low duty cycle applications, a subthreshold leakage reduction technique called Short-pulse Power Gated Approach (SPOGA) is proposed [12]. The SPOGA is implemented in combinational circuits (logic gates and arithmetic circuits) and proved that the reduction in subthreshold leakage is excellent with good leakage saving [8,10,12].

Importantly, the reduction of dynamic power consumption and the technology scaling are not done without supply voltage scaling [5]. The variation in supply voltage changes the behavior of short channel transistors and thereby SCE changes the voltage levels of the transistor [2]. The reduction of supply voltage V_{dd} along with the scaling of threshold voltage is the practicing mechanism to avoid the gate overdrive and thus the speed is unaffected [4]. However, the reduction in V_{th} tends to increase subthreshold leakage and increases the static or sleep power consumption of the circuit. This poses challenges on the design of leakage reduction techniques. Hence, the impact of scaling-down of V_{dd} on subthreshold leakage power reduction is importantly considered.

II. LITERATURE REVIEW

As scaling down of supply voltage V_{dd} is a part of the technology scaling, the impact of V_{dd} is of a significant criterion. The scaling down of V_{dd} reduces the drain voltage, which impacts the channel also [1, 2]. The Drain Induced Barrier Lowering (DIBL) effect becomes low and increases the threshold voltage, which exponentially reduces the I_{sub_leak} as in figure 1. Any leakage reduction technique is to be designed with good tolerance of supply voltage variation. In this paper, the proposed SPOGA technique is undergone an investigation of subthreshold leakage reduction at the sleep state of combinational circuits with the stress condition of three different supply voltages of 1V, 800mV and 600mV.




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Vulnerability Assessment in Heterogeneous Web Environment Using Probabilistic Arithmetic Automata

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ABSTRACT In the current scenario most of the business enterprises are running through web applications. But the major drawback is that they fail to provide a secure environment. To overcome this security issue in web applications, there are many vulnerability detection tools are available at present. But these tools are not proactive and consistent as it does not adapt to all kinds of recent updates and is unable to track new emerging vulnerabilities. For the long-term functioning of a business enterprise, statistical data with efficient analytics on vulnerabilities is required to enhance its security impacts. Predictive Analytics is a powerful solution to effectively arm the recent incident response to modern-day threats. Predictive Analytics provides a proactive and decision-making approach and insights into how well security programs are working. It can also help to identify problem areas and can warn about imminent or active attacks in heterogeneous web applications to enhance the former features and analyze the origin and pattern of the attack in a more effective manner. The pattern analyzed through research is given as an input to the Machine Learning techniques such as Deterministic Arithmetic Automata (DAA), Probabilistic Arithmetic Automata (PAA) to predict the probabilistic value as an output. From the obtained probabilistic values, we can detect the cause of an attack, prevent the heterogeneous web application of business enterprises from further impacts and find the penetration level of an attack from web application to web service.

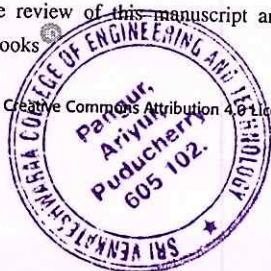
INDEX TERMS Security analytics, Deterministic Arithmetic Automata (DAA), probabilistic arithmetic automata (PAA), heterogeneous web application.

I. INTRODUCTION

Today's web applications are called heterogeneous because it is a combination of web application (HTTP) with web service (SOAP), web application (HTTP) with web service (REST), and web applications with both web services (SOAP and REST), so these can contain many security issues and the global distribution of these applications makes them prone to attacks that uncover and maliciously exploit a variety of security vulnerabilities. OWASP (Open Web Application Security Project) community helps organizations to develop secure

web applications by evaluating and benchmarking (top 10) the various vulnerabilities like injection, Broken Authentication, Cross-Site Scripting (XSS), Security Misconfiguration, etc. Many security analysis tools like RESTUI, Burp suite, SOAPUI are available in the market today to monitor and detect various vulnerabilities and attacks in the Web application. But these available tools consider only existing vulnerabilities that occurred in the web applications. Hence the predictive model in association with the Probabilistic Arithmetic Automata (PAA) paves a way for exhaustive prediction over vulnerability detection and prevention in the heterogeneous web environment. Security analytics [1] is used to detect attacks as fast as possible thereby enabling IT

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Certain Investigation of SARS-COVID-2-Induced Kawasaki-Like Disease in Indian Youngsters

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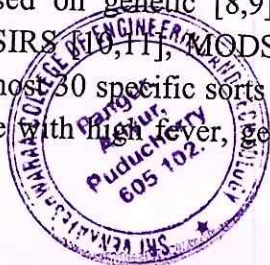
Abstract:

The SARS-CoV-2 virus poses a serious threat to the medical and scientific communities. Due to the D614G nutrients from CoV establishing the gene expression of SARS-CoV MERS-CoV, health systems deal with passengers' record volume and competing views regarding SARS-CoV-2 and its genotoxic properties [1-5]. Researchers reported [6] diagnoses of multisystemic inflammation symptoms in infants (MIS-C), which is analogous to Kawasaki disease, as the COVID-19 Epidemic spreads (KD). Due to the lack of a diagnostic marker for KD, the condition is diagnosed using the American Society of Cardiology's criteria, in this case, with a related SARS-CoV-2 infection. We believe it is relevant to notify five diagnoses of KD that managed to meet the WHO's definition of an MIS-C case.

Keywords: Kawasaki disease, sars-cov-2, multisystemic inflammatory syndrome, child, clinical case.

Introduction: Case reports are significant resources for developing critical thinking skills based on health experience. Even though the first research articles reported a pretty mild case of SARS-CoV-2 disease in patients, a new summary of Covid-19 appears in the clinical practice in late April/early May 2020, as early life MIS-C is partially associated with SARS-CoV-2 infection and has striking similarities to other inflammation diseases in children, such as KD, streptococcus staph disease, and a new summary of Covid-19 seems to in the pediatric population in late It can also cause abnormally high chronic inflammation and cervical syndrome, that can be mistaken for meningitis or typhoid [7].

Endotheliosis based on genetic [8,9] and immunocompromising (IC) CHAOS with the advancement of SIRS [10,11], MODS, and the Until [12-14] is known to be the invoking mechanism of almost 30 specific sorts of ulcerative colitis. The initial treatment describes an aggressive disease with high fever, generalized transgressive exanthema, femoral erythema,



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Certain investigations of ANFIS assisted CPHO algorithm tuned MPPT controller for PV arrays under partial shading conditions

Nammalvar Pachaiyannan¹ · Ramkumar Subburam² · Meganathan Padmanaban³ · Annapoorani Subramanian⁴Received: 2 June 2020 / Accepted: 20 November 2020
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Abstract

This paper conceptualizes development of solar energy harvesting in partial shading situations. Two methods, namely Photovoltaic (PV) system topology design and Maximum Power Point Tracking (MPPT) techniques, can well reduce partial shading effects. An active hybrid MPPT controller suggested harvesting PV power called the Adaptive Neuro-Fuzzy Inference System (ANFIS) assisted Crowded Plant Height Optimisation (CPHO) algorithm. In the multi-string PV system configuration, the DC–DC boost converter is operated between the PV string and inverter to maximise the power yield. The duty ratio of converter must be adjusted and kept at an optimal level to obtain maximum power from the PV array. During uniform irradiance condition, the CPHO tuned MPPT controller itself gives the optimal duty cycle. Under partial shading circumstances, the PV array power versus voltage characteristics has several peaks. Hence optimal duty cycle can be obtained in two stages. In the first stage, ANFIS performs estimation of Global Maximum Power Point (GMPP), among multiple Local Maximum Power Point (LMPP) peaks and tracks close to a peak power point. The second stage CPHO algorithm fine-tunes and attains the exact point of GMPP. Hence, the suggested hybrid MPPT controller detects the GMPP more accurately and settles down the oscillations of the duty cycle in a fast manner. The performance enlivened by getting optimal duty cycle, and this proposed approach fortified through the MATLAB/Simulink platform.

Keywords Partial shading condition · Hybrid maximum power point tracking · Adaptive neuro-fuzzy inference system (ANFIS) · Crowded plant height optimization (CPHO) algorithm · Solar PV system · Global maximum power point (GMPP)

1 Introduction

Electric power generation utilizing fossil fuels creates carbon emissions, which are responsible for atmospheric air pollution, in particular, the greenhouse effect (Nabavi Pelesaraei

et al. 2013). Currently, renewable energy is used globally because of the merits such as safe, clean, emission-free and inexhaustible. Among the others to control global warming and continuous depletion of fossil fuels, solar energy is an alternative one. Today's trend is to struggle to keep up with the problems in fossil fuel or coal-based power generation plants diversified into PV-based power generation.

Across tropical countries, ample electric power is possible to generate naturally from the sun using PV panels, even under time to time varying meteorological weather condition. The innovation insights of solar energy conversion systems increased globally stated by world energy council. Globally, PV based electric power generation significantly increased for the past few years. As per data given by PV magazine up to the end of 2019, the overall installed solar PV surpassed 583.5 GW worldwide. Asia has the largest share of the PV capacity worldwide, with a total installed capacity of 330.1 GW. China is the world's leading photovoltaic market with 205.7 GW of cumulative installations,

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Implementation of Double Loop Controller Tuned Super Lift Luo Converter and Unipolar Inverter for Solar Fed Grid Application

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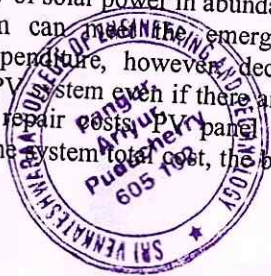
Abstract- The main objective of this article is to generate Photovoltaic (PV) power generation with high power quality before it is connected to the grid. The PV side DC/DC conversion is done by Positive Output Elementary Super Lift Luo converter (POESLLC) with high voltage conversion ratio for better performance. The grid side AC conversion is achieved by adding a double loop controller and it is used to ensure less voltage variation in grid voltage during for line and load variations. DC power received from the solar panel is stabilized in the POESLLC converter with double loop controller, which consists of a PI controller on the outer loop and hysteresis current controller inner loop. In the second stage, open-loop Pulse Width Modulation (PWM) based unipolar full-bridge inverter is used to meet the power quality issues. This modified system avoids the closed-loop controller for inverter on grid side and also omits the Maximum Power Point Tracking (MPPT) algorithm in DC/DC conversion. The proposed system has some advantages such as fewer components, less weight and avoids complexity in controllers which inject steady current to the utility grid. The effectiveness of the converters is verified through MATLAB Simulink platform.

Keywords Solar PV; Double loop controller; Hysteresis current controller; Single Phase Unipolar Inverter (SPUPI); Luo Converter.

1. Introduction

The electricity supplied by a PV power generation unit depends on the solar insolation and temperature. In tropical countries, the availability of solar power in abundance, hence the photovoltaic system can meet the emerging power demand. The initial expenditure, however, decreases the importance of the solar PV system when if there are virtually no operating costs and repair costs. PV panel cost alone approximately 57 % of the system total cost, the battery cost

[1] is around 30 % and the inverter cost along with MPPT control is around 7 % [2]. Numerous researches are going in the PV technology to reduce cost efforts. The cost of PV is anticipated to drop significantly per watt by 2020. On the other hand, the cost of other components [3] (DC/DC converter and inverter components, storage devices, instrumentation, etc.) must be reduced to reduce the total cost of a PV system. At PV cell level, the instrumentation involved in MPPT can be minimized [4]. In this article, to increase efficiency without MPPT and minimize cost



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A Study on Compatibility of Concrete Repair Materials

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Abstract

Nowadays rehabilitation of concrete structures are common challenges in all countries, the most appropriate strategy to protect the rehabilitate these concrete structures to provide some forms of protective coatings and layers. Compatibility of repair materials is important criteria (Dimensional compatibility & Chemical compatibility) before choosing a repair material, the repair material should be compatible with existing concrete substrate. It is widespread acceptance that the compatible repair material will withstand the adverse environmental condition over a design period. Good bond strength between overlay and substrate is a key factor in the performance of concrete repair materials. The main aim of good repair material is very low permeability, excellent mechanical properties, self consolidating in nature, rapid strength gain, minimal creep and shrinkage characteristics. It is important that bond offers adequate strength to withstand the stresses due to mechanical loading, Thermal effects, while also maintaining an extended durable performance. This review paper can provide many useful information on compatibility of repair material, bond strength and bond characterization and various techniques used by different authors.

Keywords: Concrete, Repair Materials, Cement, Thermal Effects

1. Introduction

Recently civil engineers are facing a common issue in the concrete industry is the increasing the need for the rehabilitation of many concrete structures (Bridges, Malls, Marine structures and many pavements etc) these are constructed in the middle of the last century. Most of the efforts of the engineers were addressed to design new infrastructures. The latter shows an important environmental concern is the researchers are able to design a successful repairs, the material and cost saving can represent a great achievement for the sustainability of the developing concrete industry.

Concrete repair mainly includes removing unsound concrete and replacing it with proper repair material or overlay material. The most important requirement for any kind of repair system is to have a excellent bond between the existing concrete substrate and overlay throughout the entire service life. It is also essential that the bond offers enough strength to resist the stresses due to



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New Clustering-Based Semantic Service Selection and User Preferential Model

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Abstract—Web service is the newest development in the contemporary system that transforms the web from a group of information into a disseminated computational device. This article proposes a new web service where the users are given the option to select the service that satisfies the quality of service (QoS) requirements from the set of discovered services. The ultimate aim of this article is to design a clustering-based semantic service selection model (SSSM) and user preferential model (UPM) to enhance the web services. The functional requirements of the service requested are mapped with the discovered services and the nonfunctional requirements are mapped to the QoS parameters of the services retrieved from the universal description, discovery, and integration. The quality attributes have been resolved by using the proposed two-tier user preference model. The Tier-I of the UPM deals with the qualification of the QoS parameters, where the user is presented with the available quality parameters for defining them in the model. The Tier-II of the UPM quantifies the qualified QoS parameters, where the user will set the preference values. Thus, the proposed clustering-based SSM and the UPM have improved the efficiency of the service selection operation, which has been shown using the three critical factors of the service retrieval discernment. The experimental results show the improved precision, recall, and F -measure values of the proposed method.

Index Terms—Clustering, semantic service, semantic service selection model (SSSM), universal description, discovery, and integration (UDDI), user preferential model (UPM) web service, web service selection.

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I. INTRODUCTION

WEB service can be noted as a web application that uses extensible markup language (XML)-based standards for communicating with external systems for providing the necessary service to the user.

The architecture of web service describes a design of a software system for handling interoperable machine-to-machine intercommunication over a network [1], [2]. The description of an interface is converted to the machine-understandable format known as web services description language (WSDL) [1]–[3]. The other system carries communication with the system using simple object access protocol (SOAP) messages, which is known in a manner prescribed by its description [5]. Web services are encapsulated, loosely coupled, self-describing, self-advertising, uniquely addressable, standards-based and platform-independent contracted functions offered through standard protocols [6].

In recent times, several service providers have created their service with the same functionality that is satisfying quality of service (QoS) [7]–[12]. The QoS is referred to as a group of nonfunctional performance factors such as throughput for service, price, availability, reputation, and reliability. The current universal description, discovery, and integration (UDDI) technology supports the selection of service based on its functional attributes and it is necessary to enhance its ability to select the service with respect to the QoS attributes. Thus, the web service selection depends on the QoS variables of the service that should be considered as vital, complex, and efficient problem-solving techniques and should be imposed to identify the best optimal solution for the same.

A web service discovery approach using word embedding and Gaussian latent Dirichlet allocation (Gaussian LDA) has been developed [7]. The developed approach first uses framework information created by word implanting to improve the semantics of service descriptions and users' queries. Then, the improved service report is loaded into the Gaussian LDA model to obtain a service description. Finally, the services have been ranked by considering the relevance between the extended user's query and service description representation.

The context-aware web service recommendation approach with a specific focus on time dimension using the K -means clustering method has been hybridized with multipopulation variant of particle swarm optimization. The developed approach further excludes the fewer comparable users to share few



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