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RAINFALL RUNOFF MODELING USING ARTIFICIAL NEURAL NETWORK

Rainfall runoff modeling of Karamana river basin

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Abstract: For a state that is prone to two different monsoon per year, it can be said with absolute certainty that rainfall is an important source of fresh water for the state. Consequently, its harness and its utilization should be studied in careful detail. Another fact that demands equal or more attention is the control of the consequences of the same that can often prove to have disastrous ramifications. Owing to the widely varying geological and other regional characteristics that describe the state, its prediction and control often seems futile. The recent trends in climate characteristics, which have resulted in delays in the rainfall calendar and an increased intensity, warrant the need for a better or a more updated climate prediction system.

Any rainfall prediction system owes its accuracy to a very recent and an exhaustive research. The Intergovernment Panel on Climate Change has come up with such a study in 2007 which has predicted certain parameters for the entire globe. Assuming rainfall as dependent on two of these parameters and deriving a relationship between these parameters and the obtained precipitation characteristics for a sample period, the rainfall is predicted for the future upto 2030 based on this relationship. These values can be used to predict the discharge using rainfall-runoff modeling. This can be used to plot the hydrographs for each year. The frequency and intensity of extreme precipitation can thus be predicted.

Key Words: Artificial Neural Network, Runoff, Hydrographs

I. INTRODUCTION

Climate encompasses the statistics of temperature, humidity, wind, rainfall, atmospheric pressure, atmospheric particle count and numerous other meteorological parameters in a given region over long periods of time. Climatology is the scientific study of climate including the causes and long term effects of variation in regional and global climates. Climate models are used for a variety of purposes from study of the dynamics of the weather and climate system to projections of the climate.

Precipitation is the only source of fresh water on earth and it constitutes the entire water supply to the region from the hydrological point of view. Precipitation is the most widely measured meteorological parameters and its records are the bases of most of the studies dealing with water resources. Assessment of the extreme rainfall event is important in hydrological risk analysis and design of urban infrastructures. In India, rainfall variability is a central driver of the national economy as it is predominantly agricultural. A change in extreme events would have a large impact on the growing economy of India as most of the population lives in urban areas. Several studies have addressed the issue of trends in rainfall in India since last century.

II. LITERATURE REVIEW

Kundzewicz et al. (2014), in their study concluded that there have been statistically significant increase in the number of heavy precipitation events in the recent years. This provides an insight towards the effect of climate change.

Kebede et al. (2013), concluded from their study that there is an increasing trend in variation of precipitation at various stations. The study also showed that different projections and subject to uncertainty with respect to the many modeling issues involved.

Aradhana et al. (2015), concluded from their study that the annual and monsoonal rainfall of all river basin is normally distributed, while post-monsoon and winter rainfalls are significantly different from normal.

Rana et al. (2014), stated that the result of their study indicated an increased amount of precipitation received in the study area in all future climate projections. The increase in the amount of precipitation ranges from 20% to 40% in various projections.

S. Satheeshkumar et. al. (2017), stated that the runoff depends on type of soil and only small percentage of the total annual rainfall is changed to runoff. It also state the good method for runoff computation.

III. STUDY AREA

The river basin stretches between latitudes 8.200 to 8.700 and longitude 76.8 to 77.4 shown in fig. Karamana river, Kilimanoor is the source of water supply to Thiruvananthapuram city and Nedumangadu town, receives waste water of the city through Killiyar. The

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Potential Use of Waste Cathode Ray Tube (CRT) Glass as Fine Aggregate in Concrete for Sustainable Built Environment: A Review

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Abstract: Electrical and electronic waste (E-waste) has become a great matter of concern all around the world. Due to the fast growth in kinescope technology, Cathode Ray Tubes (CRTs) are being replaced by lighter and thinner panels with flat displays, namely – Light Emitting Diodes (LEDs), Plasma Display Panels (PDPs) and Liquid Crystal Displays (LCDs). The environmental hazards caused by CRTs waste generation have become an extensive dilemma around the globe. Lead is contained in sufficient amounts in the waste CRTs, which causes serious hazards to human health and the environment. The increasing demand for concrete and natural resources due to swift urbanization has made it crucial to replace the natural aggregates in concrete either as a partial replacement or total replacement, without affecting the concrete performance. CRT waste glasses are abundant in silica, have low water absorption property and adequate intrinsic strength. These characteristics of CRT waste glass make it apt for usage as pozzolan or sand in construction materials. They can be partially or totally replaced for natural sand as fine aggregate in concrete. This review work extends an in-depth summary of literature detailing the reuse of CRT glass waste as a fine aggregate replacement in concrete. The properties such as water performance, thermal property, strength and durability of CRT glass waste-based concrete and their method of manufacturing have also been studied in this paper. Furthermore, a comparative performance analysis of CRT glass waste concrete with other E-waste incorporated concrete has also been included in this paper. The current work shall contribute to enhancement towards sustainability and economic development of CRT glass waste incorporated concrete in the construction industry. Thus, the issues related to CRT glass waste such as contamination of soil, environment and water bodies, health issues caused to living beings and simultaneously, the degradation of natural restricted aggregate resources could be reduced considerably by several folds.

Keywords — Electrical and Electronic waste, Cathode Ray Tubes, Light Emitting Diodes, Plasma Display Panels, Liquid Crystal Displays.

I. INTRODUCTION

Electronic Waste (E-waste) has become a menace to the environment for the past few years. Cathode Ray Tubes (CRTs) are the most prevalent among E-wastes. Due to the

fast replacement of CRTs with Liquid Crystal Displays (LCDs) and Light Emitting Diodes (LEDs), considerable proportion of waste CRT glass is being sent to the landfill nowadays [1]. CRT is considered to be a threatening glass waste and the issues associated with it causes hindrance to


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A review on structural health monitoring of railroad track structures using fiber optic sensors

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ABSTRACT

Railroads are an important part of India's public transport facilities. Railway services and networks have been emanated as a remarkably resourceful mode of transport to fulfill the continuing requisition for passenger transport and cargo services. The utilization of such systems under extreme working and loading environment makes it highly vulnerable to deterioration and failure. Hence, the Structural Health Monitoring (SHM) of railroad track structures is quite crucial for safeguarding the rail structures, in order to avoid catastrophic mishaps and also considerably decrease the maintenance cost. Today, in structural health monitoring applications, Fiber Optic Sensor (FOS) has indeed found widespread use on account of its intrinsic characteristic advantages, viz reduced size, resistance to electromagnetic interference (EMI) lightweight, corrosion and embedding capacity. FOS enables early diagnosis and characterization of damage, leading to real-time measurement, timely remediation and prevention of mechanical failures. Thus, in the existing scenario, FOS has been substantiated as a prominent tool for detailed examination of railroad track structures. The present review encapsulates the fundamental concepts of numerous fiber optic sensors. Their onsite applications in the analysis of railroad track structures are also discussed. Specifically, the emphasis will be on FOS implementation in the analysis of rails, concrete ties/sleepers and ballast, rail components, railway subgrade, railway tunnels and bridges, and structures prone to landslides as well. The simplicity, immunity to corrosion and EMI, dissociated long-range sensing; non-intrusive sensing and signal vulnerability of FOS makes them a prevalent and beneficial approach to structural health monitoring.

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1. Introduction

In the current situation, railway structures are critical to our economy and transportation sector. Present-day transportation is profoundly reliant upon the railroad frameworks since they render a fundamental part in moving a lot of passengers and cargo. Since railroads are liable for stimulating economic growth, they have prompted an expansion in passengers and cargo that is of major consideration responsible for degrading the strength of such structures. Moreover, rising demand for high-speed travel, service frequencies, and carriage tonnage pave way for a faster decline in the performance involving shorter economic life and higher expenditure for maintenance of railway structures [1–3]. This entire fac-

tor leads to damages in railway infrastructures and the recurring damages are track buckling, strain deformations, damaged components, displacements, shear crack while tunneling, settlements, and much more. These could cause disastrous collapse of major railway structures viz tunnels, rail bridges, crossings and turnouts, tracks, etc. which can cause dangerous derailments along with hazardous accidents. All these factors necessitate the need for utilization of structural health monitoring of railroad structures in real-time [4].

The managing authorities of rail structures are facing a demanding problem in the current situation that can be characterized by the effectual utilization of the limited resources available for assuring a well-founded, safe, comfortable, and prompt journey for their customers. This complicated objective could be met by operating in a proactive manner (i.e. an early state diagnosis in order to maintain a structure), rather than a reactive manner (find

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Abstract

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Fabrication and Performance Evaluation of Lightweight Eco-friendly Construction Bricks Made with Fly Ash and Bentonite

Shimol Philip, Ajin A., Farsana Shahul., **Lenin Babu**, Tina J.

Abstract: Brick is one of the foremost extensively used construction materials for masonry purpose. Emphasizing the possibility to convey imperative effect against India's present-day lodging and industrial waste concerns are of paramount importance. This could be achieved by fabricating sustainable products using industrial wastes. Alkali-activated products are assumed to be eco-friendly and economical, leading to Portland cement-free products. This project work is an attempt to discover an eco-friendly brick for construction purposes by totally replacing the normal brick components by wastes from many industries. For the investigation purpose, we developed geopolymer bricks by utilizing fly ash as the binder, foundry sand as the fine aggregate, bentonite as an additive for improving its properties and finally the alkaline arrangement (a blend of NaOH and Na_2SiO_3). Fly ash combines with alkalis such as Sodium Hydroxide (NaOH) and Sodium Silicate (Na_2SiO_3) creating an aluminosilicate gel, that shows properties similar to that of cement and it can be used as the environment-friendly binding material. The design mix proportions of the current work are 0.54:0.44:0.04 (fly ash: foundry sand: bentonite), solutions to fly ash ratio is 0.5 and the ratio of Na_2SiO_3 to NaOH is 1.5. The basic characteristics of bricks such as compressive strength, water absorption capacity, density, soundness, efflorescence, and hardness were tested. It attains a compressive strength value ranging between 6-25Mpa, water absorption value in between 5-12% and also the developed bricks were light in weight. Also, the final conclusions were drawn after comparing the test results with other geopolymer bricks and clay burnt bricks. Geopolymer bricks seem to be incredibly beneficial as they will amalgamate a large quantity of industrial wastes. The utilization of waste raw materials (except for alkaline activator solution) resulted in a substantial reduction in the estimated production cost of the bricks.

Key Words: Fly ash, Foundry sand, Bentonite, Sodium Hydroxide (NaOH) and Sodium Silicate (Na_2SiO_3)

I. INTRODUCTION

All through the years, there has been a considerable development in the brick manufacturing industry because of an up swinging requisite for dwelling and infrastructure in

developing nations. Over and above, swift industrial development in these countries has created a substantial quantity of waste that has a negative impact on the environment. The increasing demands for infrastructure and environmental pollutants have indeed necessitated utilizing these wastes as raw materials for the manufacturing of bricks [1]. Moreover, the usage of cement or different chemical binders will increase the greenhouse gases; since a normal cement manufacturing unit produces an embodied carbon of 0.95 kg carbon dioxide per kg of cement that is produced [2, 3]. Therefore, the recent trends of researches are finding its way towards experimentation of eco-sustainable alkali-activated bricks. It renders the likelihood of using 100% waste materials as the base material, which gives rise to ordinary Portland cement-free bricks or hybrid cement. Activation of aluminium oxide and silicate solids by alkaline liquids ends up in the formation of geopolymeric gel pursued by setting and solidifying at a specific curing condition [4]. Geopolymer is a mineral polymer that outcomes from the combination of many small mineral molecules into a covalently bonded network i.e. geopolymer synthesis [4]. Thus, the geopolymerization (alkali activation) process is simply the synthesis of aluminosilicates in strong alkaline media. Many studies have proven that, in order to get an alkali-activated product, three main constituents are required: raw material (source of alumina and silicates), filler and alkali-activators. The distinctive raw materials utilized for alkali activation are - industrial wastes or by-products such as fly ash (FA), boiler ash (BA), rice husk ash (RHA), mining waste tailing (MT), ground granulated blast furnace slag (GGBS), sugarcane bagasse ash (SCBA), and fillers like stone dust, kaolinite, stone dust, lateritic clay and many more. Hydroxides and silicates of alkali (to be specific Ca^{2+} , Li^+ , Na^+ , K^+) are the foremost extensively used alkali-activators. The implementation of alkali-activated geopolymer bricks or masonry blocks in the field construction proved to be eco-sustainable, efficient and cost-effective.

Blasker T. et al. [5] did investigations to examine the fabrication of geopolymer blocks utilizing fly ash and quarry dust. As the level of fly ash decreases below quarry dust, water absorption, and compressive quality increases. Preetinder Singh et al. [6] carried out an experiment on geopolymer blocks utilizing fly ash and foundry sand. This investigation depends on the fabrication of geopolymer blocks utilizing fly ash, mineral material, foundry sand, and alkaline activators. The respective work is done by PC

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Design and Analysis of Stub Loaded Resonator

G.Gaswin Kastro, M.C.John Wiselin

Abstract— Microwave filters are an important component in front end receiver of microwave communication system. They are used for passing frequency components within a particular pass band and to reject the interfering signal outside of that operating frequency band. Their functionality also includes to reject the unwanted product from the output of the mixers and amplifiers, and to set the IF bandwidth of the IF receiver. Important parameters include cutoff frequency, insertion loss, out of the band attenuation rate measured in dB per decade of the frequency. Filters with sharper cutoff frequency provide more rejection for out of the band signals. Insertion loss, measured in dB, is the amount of attenuation seen by signal through the pass band of the filter. Size requirement for most of the Personal Communication Systems require filters to be compact in size and wideband. This work presents design of Microwave filters in Global System for Mobile and Wireless Local Area Network Bands. Afterwards, a detailed analysis for designing filters with these requirements is presented. First, a Conventional T Shape Bandpass Filter is presented. Consequently, A Modification in T Shape Microstrip Bandpass Filter is presented with considerable size reduction.

1. BRIEF REVIEW OF LITERATURE

L. Bousbia *et al.* (2013) investigated Study and Modeling of T and L shaped resonators for UWB Band Pass Filter. His research of T and L shaped resonators are considered for the design of UWB band pass filter which operates at the center frequency of 5 GHz. Unlike any earlier work, he propose a novel analytical performance study of T and L shaped resonators that investigates the relationship between the input admittance of both resonators and the electrical lengths. In this work, bandstop filter loaded with two T, L and mixed open stubs, are proposed to design compact UWB band pass filter. Three topology of UWB bandpass filter and their comparison study between the performances of these structures was discussed. Bin You *et al.* (2014) proposed a High-Selectivity Tunable Dual-Band Bandpass Filter Using Stub-Loaded Stepped-Impedance Resonators. Compared with the traditional tunable filter, the source-load coupling and T-shape stub-loaded lines are employed in his design. The proposed BPF architecture has the advantages of high selectivity and less control voltages. In the overall tuning range, the proposed filter is designed with 5–6 transmission zeros and more than 30 dB rejection between the two passbands. Meanwhile, only one control voltage is needed for each passband. A prototype of this filter is fabricated and measured. The measurement results show great agreement with simulated results, which show that the first passband can be tuned in a frequency range from 0.8 to 1.02 GHz, and the second passband varies from 2.02 to 2.48 GHz.

Leila. *et al.* (2011) proposed an ultra-wideband (UWB) bandpass filter using loop resonators. They deliver excellent scattering parameters with magnitude of insertion loss, S_{21} lower than 0.09 dB and return loss found better than 20 dB. The demonstrated bandpass filter has 3-dB fractional bandwidth of 65% of center frequency (5.46 GHz), in the range of 3.7 GHz to 7.22 GHz. The filter is constructed by ring resonator and T-shaped stub loaded at the line center. Reungyot Lerdwannittip *et al.* (2011) proposed a Bandpass Filters using T-shape Stepped Impedance Resonators for Wide Harmonics Suppression and their Application for a Diplexer. The T-shape stepped impedance resonators are adopted for the design of microstrip bandpass filters for wide harmonics suppression. The proposed filters are operated at the center frequency of 2.44 GHz and 5.20 GHz, respectively. These bandpass filters have been also applied for a high performance diplexer. The insertion losses at the center frequencies of 2.44 and 5.20 GHz are 1.23 and 1.18, respectively. The applicable return losses for both frequency bands and a wide stopband better than 17 dB up to 20 GHz have been obtained.

Kuan Deng *et al.* (2012) proposed a compact dual-band bandpass filter using asymmetric T-shaped resonators. Two compact dual-band bandpass filters with T-shaped resonators are used. The demonstrated filters are four-stage design composed by four T-shaped resonators in conjunction with the microstrip lines in the I/O ports. The location of the two passbands can be adjusted by suitably changing the impedance ratio and the length of the T-shaped resonators. For comparison, two different feeding structures are employed, saying, coupled-line feeding and tapped-line feeding patterns. For better energy input in the second pattern, the two resonators connected with the tapped-lines are asymmetric. For demonstration, one dual-band filter was designed at 2.45 GHz and 5.8 GHz. Andres Li Shen. *et al.* (2014) proposed a novel dual-band bandpass Filter using asymmetric stub-loaded Stepped-Impedance Resonators at frequencies of 1 and 2.6 GHz. Each resonator is first designed and simulated to operate at the given frequencies. Then, they are coupled together while applying suitable coupling configurations at the input and output to improve the filter's performance. The filter's input reflection coefficients (S_{11}) are -11.2 and -12.9 dB and insertion loss (S_{21}) are -0.44 and -1.2 dB at the two design frequencies respectively.

Manuscript received June 10, 2019.

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
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
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Design of Wide Band Pass Filters

 G. Gaswin Kastro and M.C. John Wiselin




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1-10 GHZ Couple Line Band Pass Filter Design

👤 G. Gaswin Kastro and M.C. John Wiselin

Abstract

Bandpass filter play a very vital role in the field of communication. With the advent of large number of communication the devices working a range of frequencies the use of Microstrip technology offers us a very compact realization of a microwave filter thereby reducing the filter size and output parameters. This work presents a tunable dual-band tunable bandpass filter (BPF) with dual band bandpass response with a novel tunable dual-mode character in the range of 1-15GHz and a single band bandpass filter in the range of 1-10GHz. The proposed dual band bandpass filter design primarily consists of tunable components such as varactor diodes and capacitances to bring about tunability in the filter design. The circuit designed is a Triple U-shaped circuit so as to obtain a compact filter structure which has varactor is placed at the center of the microstrip circuit and capacitances so as to produce a tunable bandpass filter response. This approach has enhanced the tunability of the proposed dual band filter by tuning the varactors and capacitances present in the circuit, thereby exhibiting a uniform tuning range with a minor changes in the values of the capacitor and varactor. Therefore, a uniform tuning is obtained by employing capacitance and varactor and the circuit can maintain nearly a constant bandwidth over the tuning range. The single band filter is designed to work in the range of 1-10GHz where the single band can be tuned between the entire operating frequencies. Simulated results are found to be more efficient. The S-Parameter $[S(2, 1)]$ results for the dual band bandpass filter show that the first passband can be tuned in a frequency range from 2.4 to 4.45 GHz, whereas the second passband varies from 8.5 to 11 GHz.

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Characteristic Mode Examination on Various form of Antenna for MIMO

Sundaramoorthy A, M.C. John Wiselin,

Abstract— The main plan to create one of a kind modified sorts of reception apparatus with the ideal radiation qualities reasonable for MIMO applications. It is utilized to get scientific methodology for reception apparatus proposition and anticipating transmitting execution of radio wire by examination of trademark modes. The Examination of attributes mode is utilized to create wanted current conveyance and transmitting execution of a receiving wire. Among various current which is disseminated over surface of reception apparatus. Required mode is distinguished at Finest Feeding Point (FFP) for structured radio wire. The planned receiving wire work at various benchmarks so it might give multiband or broadband activity. It might be encourage symmetrical radiation designs at a given recurrence of numerous trademark modes, which has the viable element of Multiple Input and Multiple Output (MIMO) Antenna.

Keywords—Examination of characteristic modes (ECM), Finest Feeding Point (FFP), microstrip antenna, reflection coefficient, current distribution, radiation pattern.

I. INTRODUCTION

In Present and future remote correspondence. Proficient usage of radio wire are significant part. Single radio wire taking care of numerous recurrence than single recurrence is testing one. Such capacity reception apparatus must have one of a kind shape, best Finest Feeding point (FFP), and capacity to deal with wanted radiation out of numerous recurrence. A few difficulties are Interference and requirements is primary issue here. The issue with radio wire is that the physical precision is less, so the working standards of the reception apparatus are lost. The Examination of trademark modes (ECM) gives the quantity of current conveyance and radiation design concerning the various methods of recurrence. The Examination of trademark modes was initially facilitated by Garbacz [1] and regularly built by Harrington and Mautz [2]. A course for steering edges of irregular shape is created [3]. At that point the plan of radiation mode is improved to appropriate for current applications [4]. The modular examination is proposed for Multiple Input and Multiple Output (MIMO) applications [5-7]. Utilizing this strategy, both multiband reverberation and data transmission is accomplished [8]. This examination is additionally utilized for execution improvement of circularly captivated opened fix radio wire [9]. Characteristic mode examination (CME) might be connected to upgrade reception apparatus size and shape, alters antenna topology, fixing devoted putting reception apparatus and make appropriate radio wire design for ultra wideband

(UWB) transverse electromagnetic (TEM) horn and long term development (LTE) reception apparatus utilizing FEKO [10].

The examination of Eigen current dispersion gives new sustaining strategies. This Finest Feeding Technique make simplicity to plan ultra wideband reception apparatus which coordinated in chip displayed handsets [11]. The trademark mode is identical to the method of moments (MoM) conditions [12]. Another strategy for following methods is presented for hypothesis of trademark mode [13]. The MoM receiving wire is recreated with MATLAB utilizing Rao-Wilton-Glisson (RWG) premise capacities [14] and [15]. The modular strategies are additionally used to configuration convoluted shapes like fractal fix antenna [16]. The impacts of ground plane size, impacts of space on the scored recurrence attributes and impacts of scaling down of single post radio wire is analyzed with utilize various methods of reception apparatus [17].

The remainder of the bit is composed as given underneath: Segment II briefly outlines the assessment of utilitarian mode and stream diagram of ECM. In Section III and IV, the structure of antenna, reflection coefficient, and current stream over surface and radiation design at different mode analyzed for rectangular and hexagonal state of radio wires are clarified. At a last point, accomplished comprehension is given in Section V.

II. EXAMINATION OF CHARACTERISTIC MODES

The Examination of characteristic modes (ECM) gives the quantity of current dispersion and radiation design as for the various methods of recurrence. The present dissemination which is reliant upon eigen values and eigen vector. The numerical detailing of trademark modes that relates the current on directing body as clarified in [2].

$$[L(C) - E^t] \tan = 0$$

(1)

In which "tan" is tangential segments over the radio wire surface S. The character L written in (1) is linear and it is expressed by

$$L(C) = j\omega A(C) + \nabla \Phi(C)$$

(2)

Where A(C) and $\Phi(C)$ are vector and scalar possibilities individually. Physically, the term $-L(C)$ can be considered as the electric power anytime in space. This implies the administrator L in (1) has the component of impedance.

$$Z(C) = [L(C)] \tan$$

(3)

As drawn from [1], the impedance administrator Z is perplexing, and it tends to be composed as,

$$Z(C) = R(C) + jX(C)$$

(4)

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
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
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Development of Class E2 Power Converter Using Power Amplifier

👤 S. Muthukumar, M.C. John Wiselin and K. Suresh Kumar

Abstract

In this paper a class E2 power converter is designed using class E power amplifier. The concept of combining the use of GaN HEMT devices, both for the inverter and the synchronous rectifier, with multi-harmonic matching networks has been utilized. The power amplifier is an inverter and the process of amplifier converts the DC to AC signal, the inverter designed by using the transistor of RF3931 and achieves the steps for testing the transistors range verified and the HSMS2862 rectifier used for high switching frequency and converts AC to DC signal and for high output voltage compare to inverter the rectifier achieves high output voltage to develop for very high frequency applications and the matching circuits developed to matches the inverter and rectifier. The resultant measurement of power converter achieves 60dBm output voltage.

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Single Patch Antenna with Multiple Feed

Sundaramoorthy A, John Wiselin M C

Abstract: In this article single patch antenna with multiple feed lines is presented. The antenna is tested with four ports each separated at 90 degrees. The ports separated at 180 degrees have the same effects and same polarisation. The S-parameter of port 1 and port 2 are same due to horizontal polarisation then port 2 and port 4 are same due to vertical polarisation. The Port 1 and Port 3 resonates at frequency of 2.092GHz and 4.563GHz. It covers applications of UMTS (1.885GHz - 2.2 GHz) and C band (4 GHz - 8GHz). The Port 2 and Port 4 resonates at frequency of 1.66GHz and 5.155GHz. It covers applications of GPS (1.565GHz - 1.665GHz) and WLAN (5 GHz - 6 GHz). The return loss of the frequencies is less than 10dB. The isolation among the ports are less than 15 dB.

Index Terms: Patch Antenna, Microstrip Antenna, Rectangular Patch and Multiple Feed Antenna.

I. INTRODUCTION

The improvement of the handheld devices in wireless communication is required to protection further one frequency band in order to sustenance more wireless submissions. Recently, many antennas have been designed to satisfying the requirements of various wireless communication systems used for various applications, such as: GSM-global systems for mobile communication: 890-960MHz, GPS-global positioning system: 1575MHz, PCS-personal communication system:1850-1990MHz, DCS-Digital communication system:1710-1880MHz, WLAN-wireless local area network systems: 2400-2484MHz and 5150-5350MHz and WIMAX-worldwide interoperability for microwave access: 3300-3500MHz. Table 1.1 shows some common wireless communication bands which cover various wireless applications. Antenna is a simple element in wireless communication systems and it is a major component in system performance and size. It has to satisfy three classes of requirements; they are geometrical characteristics, electrical performance and manufacturing constrain. All this properties are available to design antenna for wireless communications. Microstrip revolution faced in antenna technology in 1970's, which satisfied all above indicated requirements of antenna design. Researches are going on meta-materials and nano-materials to diminish physically sub-miniature wavelength antennas. Without those special materials, various kinds of compacted antennas like dielectric resonator antenna (DRA), Planar-inverted-F-antenna (PIFA), Microstrip, Planar-inverted-Cone-antenna (PICA), and published monopole antenna. Table 1 represents the frequency bands for various wireless applications. Microstrip antenna is used for the applications such as automobile

vehicles, space craft, satellite, and aircraft applications.

Table.1 Wireless communication bands for various wireless applications

Wireless Services	Frequency Bands	Number of Antennas
WiFi	IEEE 802.11b/g/n: 2.4-2.48 GHz IEEE 802.11a/n: 5.15-5.85 GHz	3 x 3 MIMO
WIMAX	IEEE 802.16: 2.3-2.4 GHz, 2.5-2.7GHz, 3.3-3.8 GHz, 5.15-5.85 GHz	Diversity: main and aux (1 x Transmitter, 2 x receiver)
3G	GSM 850: 0.824-0.894 GHz GSM 900: 0.88-0.96 GHz DCS 1800: 1.71-1.88 GHz PCS 1900: 1.85-1.99 GHz UMTS: 1.92-2.17 GHz	Diversity: main and aux (1 x Transmitter, 2 x receiver)
Bluetooth	IEEE 802.15.1: 2.4-2.48 GHz	Single
GPS	1.575 GHz	Single
UWB	3-10 GHz	Single

Microstrip antenna contains of a ground plane on the other side and a burning patch on single side of a dielectric substrate. Micro strip antennas are also mentioned to as patch antennas. The most popular configuration of microstrip patch is the rectangular patch antenna. The frequency of process of the patch antenna is defined by the L- length. The W- width of the microstrip antenna gearshifts the input impedance. The radiation in microstrip patch antenna is along the width and not along the length of the patch. The electric field is zero at the middle of the patch, minimum (negative) on the differing side and maximum (positive) at one side. The mode supported by rectangular patch antenna is originate by the ground plane, radiating patch, and the substrate material which is in among the two planes. The mode support by rectangular patch antenna by considering the small substrate height ($h \ll \lambda$) are

where z is perpendicular to the patch. The dimensions of rectangular patch and the order of the modes control by varying the width and length of patch.

II. BACKGROUND STUDY

Several methods to obtain polarization diversity and enhance the isolation are proposed by many authors. The brief review of the paper is given as follows: [1] Designed a square ring slot antenna for ultra-wideband with appropriate isolation and impedance bandwidth. It is used for dual polarisation applications. The measured impedance bandwidth is 120% (3-12GHz) for each the ports. The distinguished isolation is greater than 20dB over best of the band. The metallization at the substrate top, bureaucracy the ground

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Sundaramoorthy A, Research Scholar/EEE, Bharath Institute of Higher Education and Research, Chennai, India.

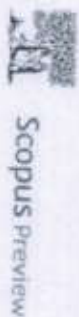
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Class C Power Amplifier Using GaN Hemt Transistor

✎ S. Muthukumar and M.C. John Wiselin

Abstract

Power Amplifiers are inherent part of a transmitting chain which required boosting the signal to overcome channel losses between transmitter and receiver. Power amplifiers are the prime consumers of the power in a transmitter hence during design stage designers need to look for the efficiency which is the figure of merit to know how efficiently DC power can be converted to RF power which is known as PAE (Power Added Efficiency). Also notice that efficiency translates either into lower operation costs e.g. Cellular Base Station or longer battery life e.g. Wireless handheld device such as Mobile Phone. Power Amplifier linearity is another important aspect of PA design so as to preserve the input and output power relationship to maintain the signal integrity. The design of PA often requires trade-off between linearity and efficiency.

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Wideband to Sub-band Reconfigurable Microstrip Antenna

A. Sundaramoorthy, John Wiselin, B.S. Sreeja, E. Manikandan and R. Renita

Abstract:

In this paper, wideband to sub-band frequency reconfiguration has been achieved in a simple and compact microstrip patch antenna. The antenna has a ground slot embedded with two PIN diodes. Based on the position and state of the PIN diodes in the ground slot, the resonance bandwidth of the antenna is varied. The antenna operates at a wideband of 4-12.4 GHz and can be reconfigured to operate in two sub-bands 4.2-7.2 GHz and 4-10.2 GHz.

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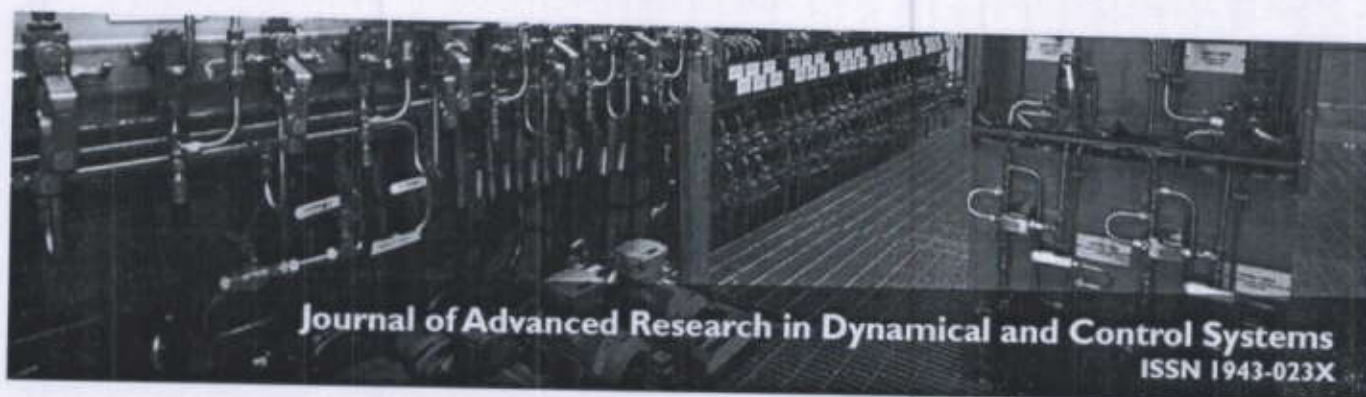


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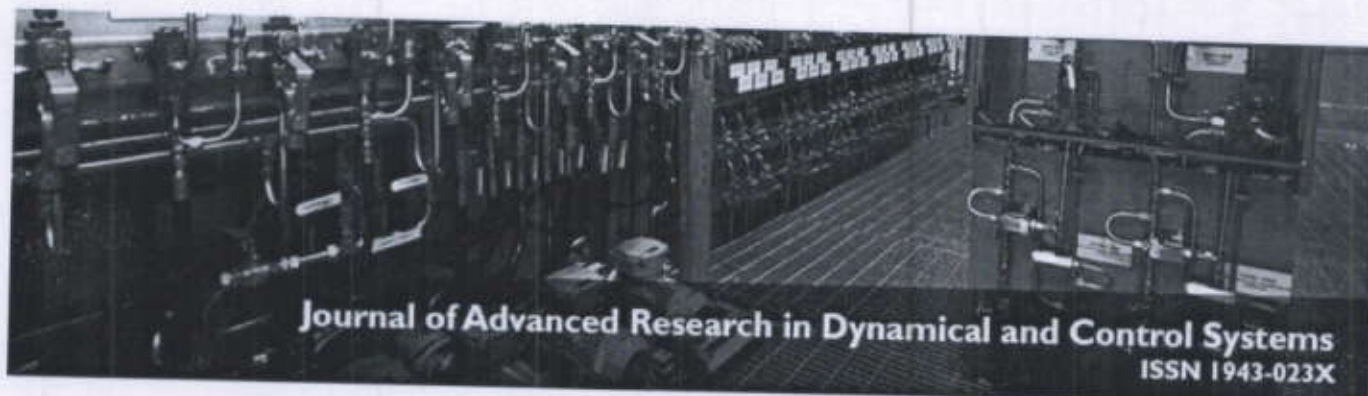
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Design and Analysis of Electrostatic Energy Harvester Using Vibration Energy for Sensor Networks

V.J. Bycil and Dr. M.C. John Wiselin

Abstract:

Energy Harvesting is a Mechanism which converts excess energy in to usable power in environment for the low power applications. Various researches based on energy harvesting had focused on electromagnets and piezoelectric materials for harvesting the energy. This paper present a new method for extracting energy from an electrostatic capacitive energy harvester by measuring the acceleration of human during different activities such as walking, running, jumping, cycling and convert it to electrical energy. Then the harvested electrical power is converted to DC by using DC-DC converter. The converted power is stored in the Energy storage devices.

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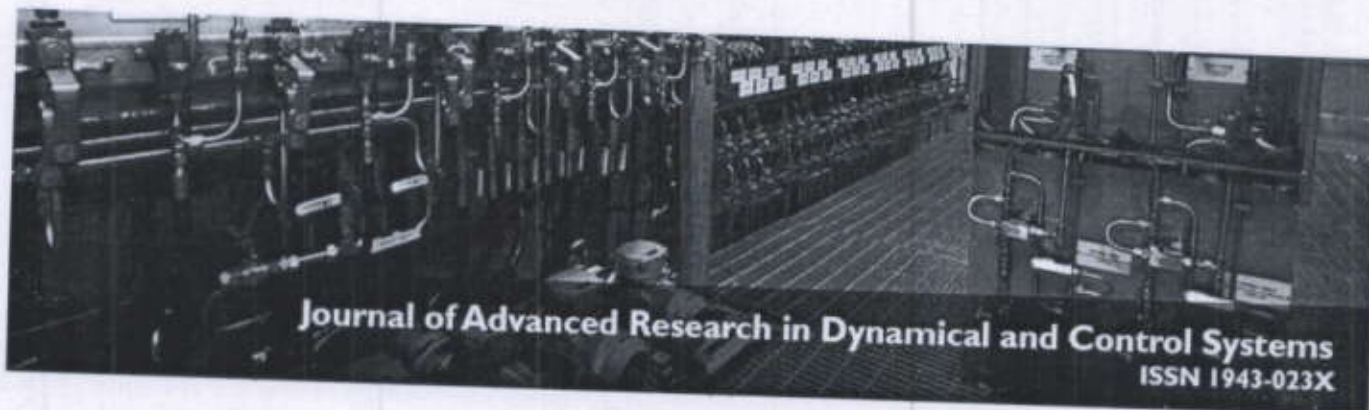
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Measurement of Acceleration in Energy Harvesting System Using Hybrid Energy Harvesting Technique

V.J. Bycil and Dr.M.C. John Wiselin

Abstract:

This paper presents the Vibrational energy system used for electro static energy, electromagnetic energy and piezo stack and the piezoelectric energy harvester for supplying power to low-power electronic devices, especially low-power wireless sensors and actuators. Various analyses on energy harvesting had concentrated on electromagnets and piezoelectric materials for energy harvesting. The main aim of the paper is to estimate the acceleration of people during different activities such as running; walking; jumping and cycling. Then the harvested electrical power is converted to DC by using AC-DC converter is converting into electrical energy using piezo electric method of energy conversion. The energy harvesting input ac voltage boost up the dc output by using ac-dc boost converter. The converted power is saved in the energy storage devices.

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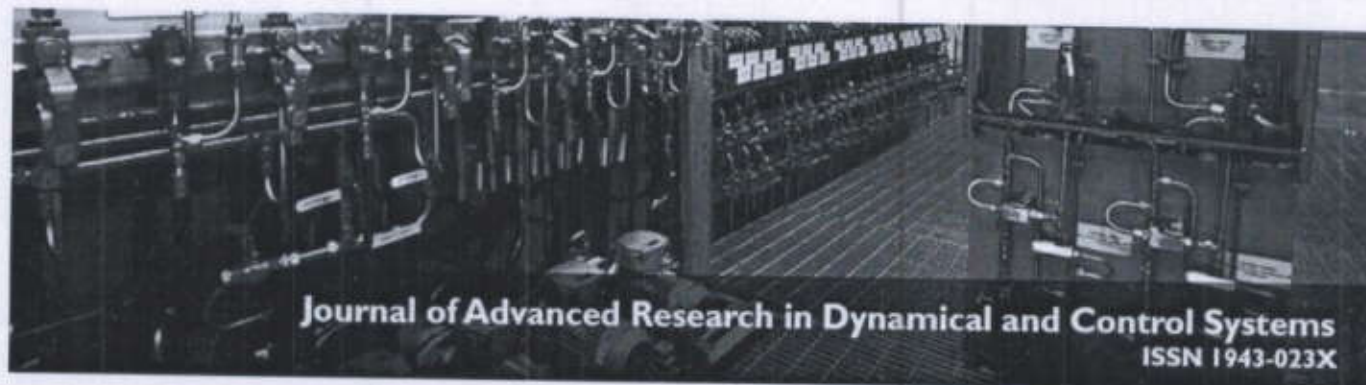
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Narrowband Tunable Microstrip Antenna

A. Sundaramoorthy, John Wiselin, B.S. Sreeja, E. Manikandan and R. Renita

Abstract:

In this paper, narrowband tuning is achieved using PIN diodes. The circular patch antenna is fed by Coplanar Waveguide (CPW) feed. The circular patch is embedded inside a rectangular patch shaped slot. Two square slots of equal size are found on either side of the patch. The square slots can be either connected or disconnected to the rectangular slot by switching OFF or ON a pair of PIN diodes. The antenna can tune frequency in the range of 0.1 GHz between the WLAN frequencies 4.8 GHz, 4.9 GHz and 5 GHz.

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Modelling and Signature Analysis of Vibration Energy Harvesting System using Electromagnetic Energy Conversion

¹Bycil V J, ²M.C John Wiselin,

¹Department of Electronics and Communication Engineering
Bharath University, Chennai, India. Email: bycilvj@gmail.com.

²Department of Electrical and Electronics Engineering
Bharath University, Chennai, India. Email: wiselin16@yahoo.com.

Abstract - The electromagnetic energy harvester works on the principle of electromagnetism. It harvests the vibration energy from acceleration of people during different activities such as walking, running, jumping and cycling and converts it into electrical energy using electromagnetic principles of conversion. The harvested electrical power is then converted to DC by using AC-DC converter. The energy harvesting input ac voltage boosts up the dc output by using ac-dc boost converter. Energy storage devices are used to store the converted power.

Keywords - Electromagnetic energy harvest, ac-dc converter, electrical power, magnetic material.

1. INTRODUCTION:

Energy harvest strategy is recycled to convert the environmental energy keen on electrical energy. The translation of electrical energy beginning a vibrate resource to a renewable storage space, such at the equivalent time as chargeable batteries or super capacitors. The electrical power stored in the storage space knows how to be recycled for little power integrated circuit. Vibration power producer using laser micromachining which be capable of generate the upper limit power of 830W. The interface circuit introduces a comment control into a feed forward dc-dc (PWM) boost converter as an energy produce circuit and shows high power conversion effectiveness.

Energy can be harvest from wasted source such as solar thermal energy, vibration force and pressure force, which can be there converted into working electricity. Electromagnetic harvest systems have lesser production charge, longer period, and higher power effectiveness. Electromagnetic methods comprise linear generator and rotating generator [1]. Harvesting energy generator from shaking, as alternative energy source, has grown to be increasingly extensive since vibrations are general. Harvesting generator is calculated to work at small frequencies, close to ambient shaking, but it can be alive modified to work at towering value of occurrence [2]. Increasing the energy-conversion good organization and keeping it tall at a fairly large vibration amplitude have been not easy, and no minute energy harvester has exposed more than tens of mill watt power stage from sub millimetre pulsation amplitude. Electromagnetic force conversion, on the other hand, is beneficial owing to its

potential to drive a low impedance weight and generate a high output current [3].

Vibration-based electromagnetic energy combines by a mechanical frequency up-conversion process for harvest energy starting peripheral low-frequency vibrations within range of 1-10 Hz. In the folder of electromagnetic energy harvesters, increase the generated power compactness is accomplished by using more than degrees of choice [3]. The regulator contain the power electronics subsystem which is accountable for stimulating the transducer in the course of its energy translation sequence, and have been optimized to condense losses, and a digital control centre which generate the timing pulse which force the gates of power FETS in the power electronics subsystem [6]. Energy harvest from thermal source such as body heat and mechanical source such as human motion have been planned. There are moreover antenna network systems that harvest energy on or after the observable part of the electromagnetic field. Energy be harvest from the electromagnetic force glowing from AC power outline and use it to control a wireless antenna network by means of a low duty-cycle [7].

An electromagnetic energy harvester produces power owing to the relative association of a coil and a magnet, which induce voltage across the coil terminal. Electromagnetic harvest system contains lower construction cost, longer life, and upper power effectiveness. Electromagnetic method contains linear generator and rotating generator. In a rotary-type generator, linear vibration action is converted into rotating action using screws, chains, or gears [9]. Vibration based energy harvesting machine through a linear spring-mass method can generate utmost power output at a exact resonant occurrence, but typically with a relatively narrow

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Design And Analysis Of Sagnac Loop Frequency Characteristics

^[1]Bycil V J, ^[2]Dr.M.C John Wiselin

^[1] Ph.D Scholar, Dept Of ECE, Bharath University, Chennai,

^[2] Dept Of EEE, Vidya Academy Of Science And Technology.

Abstract: The Sagnac interferometer consists of optical components which first split light into two beams and then route each of these beams in opposite directions around a common optical path. After propagating around the optical path, both beams are recombined on a detector or screen where the resulting interference pattern can be observed. The construction of fiber optic interferometers is similar to the construction of classic optical interferometers with open light flux. They are designed for measurements of phase shift caused by an interaction between external fields and optical fiber. The value of characteristic frequency f , depends on the disturbance position. Exactly, it depends on the difference T_D Between times of reaching the interference place by wave fronts of two counter running waves with distributed phase. We can see that if the sensing loop length is increased, the characteristic frequency is decreased

I. INTRODUCTION

The optical sensor systems presented is based on the use and understanding of a reciprocal path interferometer, known as the Sagnac. In its simplest form, the Sagnac interferometer consists of optical components which first split light into two beams and then route each of these beams in opposite directions around a common optical path. After propagating around the optical path, both beams are recombined on a detector or screen where the resulting interference pattern can be observed. Fig 1 shows a simple bulk-optical configuration forming a Sagnac interferometer [2].

Light from a source is split using a half silvered mirror. 100% reflecting mirrors are then used to route the transmitted and reflected beams around a common free-space optical path before they are again incident on the half silvered mirror. This in turn combines the two beams on a screen allowing the interference pattern to be observed. Optical structures similar to this formed some of the first Sagnac interferometers

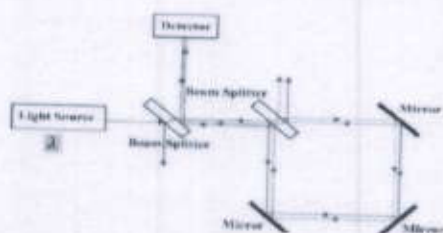


Figure 1: Basic Sagnac interferometer

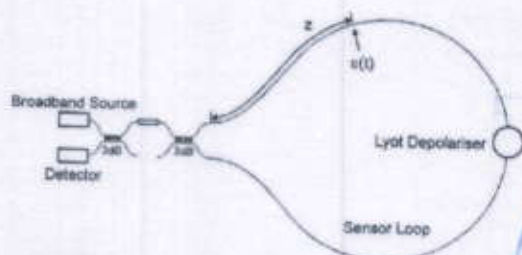


Figure2: Fiber optic Sagnac interferometer



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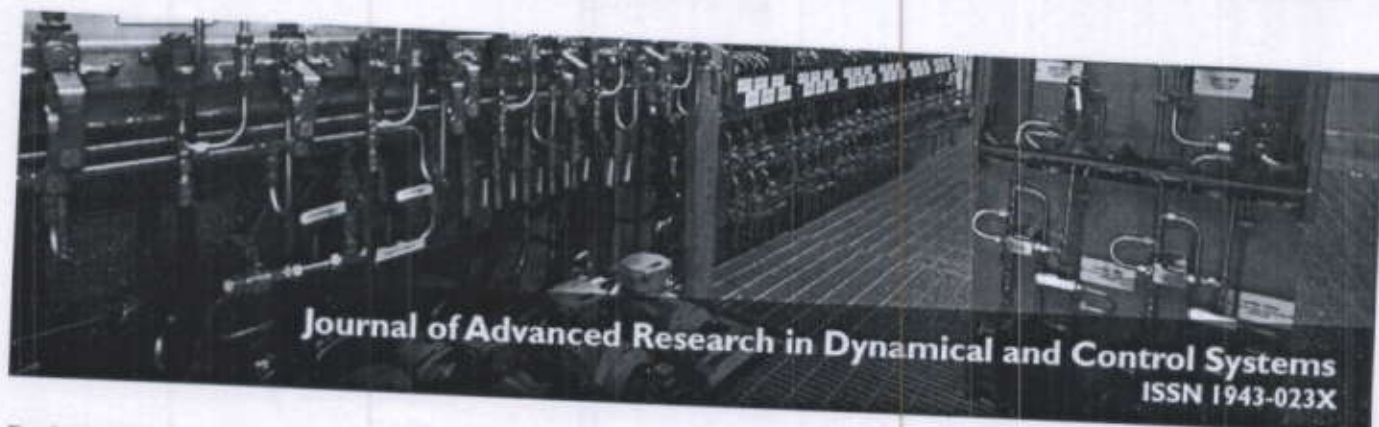
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Review of High Frequency Resonant DC-DC Power Converters

S. Muthu Kumar and M.C. John Wiselin

Abstract:

The demand for high frequency power converters is rising due to the recent technological developments to achieve high efficiency and high power. De-dc power converters are used for power regulations and electrical isolation. The output voltage needs to be regulated using dc-dc converters in several applications for wide variations in the input voltage and the load. Electrical isolation is required in renewable energy applications to isolate source and the grid. Increasing the switching frequency reduces the size of the converter; however it also decreases the efficiency and impacts in the losses. This paper presents a review on high frequency high efficiency dc-dc power converters.

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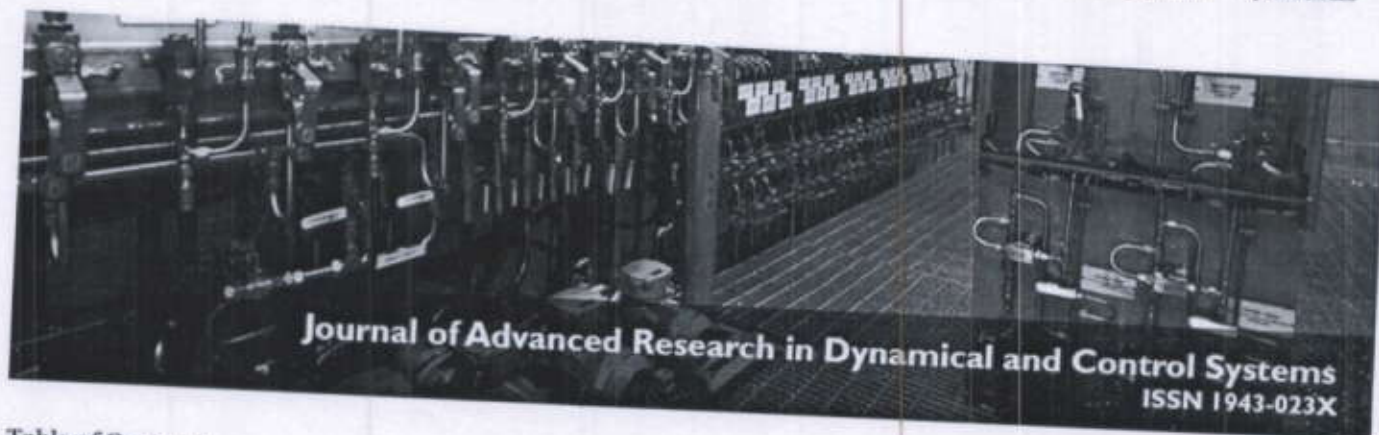


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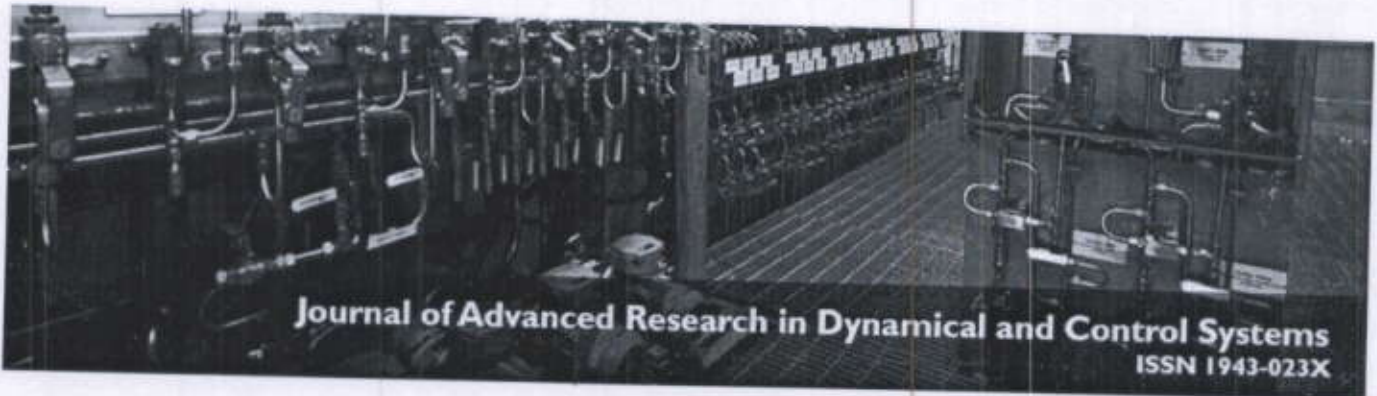
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Implementation of Maximum Power Point Tracking Method in a Photovoltaic System Using Bird Mating Optimizer

Riyaz A Rahiman and M.C John Wiselin

Abstract:

This paper presents a concise and an organized review of various maximum power point tracking (MPPT) algorithms implemented in the photovoltaic (PV) generation system useable under partial shading condition. The MPPT method for photovoltaic system under partial shading conditions using Bird Mating Optimizer. The primary function of the Landsman converter is to optimize the power output of the solar array. An appropriate control of Landsman converter through Incremental Conductance Maximum Power Point Tracking (MPPT) algorithm offers smooth and soft starting on BLDC motor. The proposed control algorithm eliminates phase current sensors and adapts a fundamental frequency switching of the voltage source inverter. Thus avoiding the power losses due to high frequency switching. The Bird Mating Optimizer has a high accuracy in the global optimization and it can provide good dynamic performance and very quick convergence rate by automatically switching between exploration and exploitation stages during the MPPT process.

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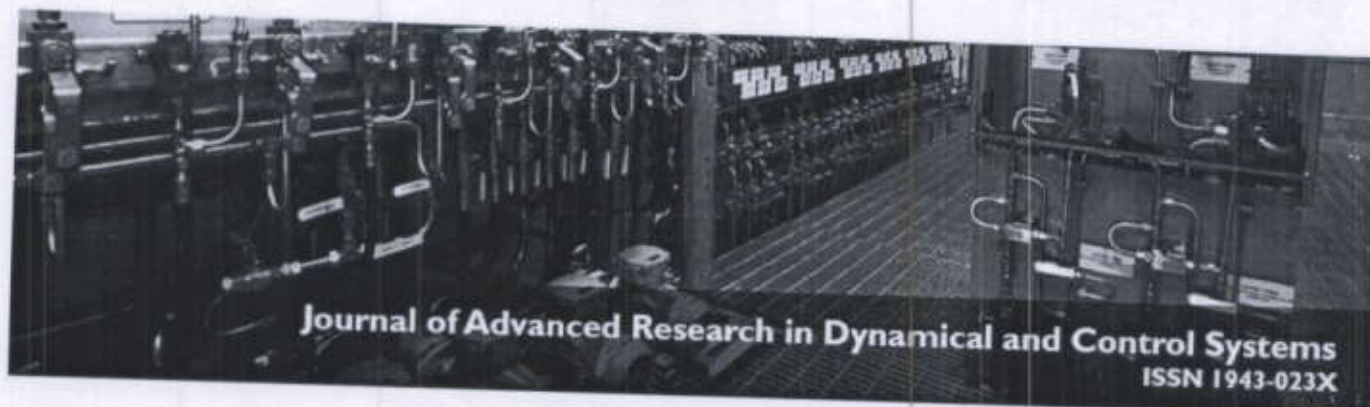
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Design of Microstrip Bandpass Filter

G. Gaswin Kastro, John Wiselin, B.S. Sreeja and T. Malathi

Abstract:

Modern microwave communication systems demand low cost, high performance multiband bandpass filters which characterize low insertion loss, high selectivity and out of band rejection together with optimized size reduction especially in wireless communication system applications such as wireless local area network and global system for mobile communications. In order to achieve the above requirements, a single filter propose to design a microstribandpass filter using stepped impedance resonator. On the basis of Quad band stepped-impedance resonator, a novel quad-band bandpassfilter is presented, which has a quad-band feature of four passbands at desired frequencies and high out of band suppression. The new coupling scheme can improve the performance of the BPF of the input and output, and the stepped impedance resonator helps reduce the size. A microstrip filter was designed and simulated, and proved the feasibility of design concept in an excellent way with insertion loss of 1.1, 2.1, 2 and 1.2 dB at 1.94, 3.6, 5.2 and 6.8GHz, respectively.

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Design of Broad Band Class E Power Amplifier

👤 S. Muthukumar and M.C. John Wiselin

Abstract

Design of the art of Microwave Power Amplifier (PA) is very challenging to researchers, as it requires for providing high power with high efficiency. PA is generally a d.c to a.c converter which is driven by its input signal. During last few years, the field of interest of microwave design has shifted to monolithic circuit from the arena of hybrid components; this reduces the cost of PA. This change is due to the advancement of semiconductor technology which makes the monolithic designs to be delivered in the hardware as they are manufactured in bulk numbers. Thus the substrates employing monolithic circuits are selected by system requirements. The other cause is that all RF and Microwave Designs can easily be implemented by CAD methods, which improves the circuit-modelling techniques. These changes make the Microwave Monolithic Integrated Circuits (MMIC) to be "time to market"

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Design of DC-DC Power Converter Using Power Amplifier

S. Muthukumar, M.C. John Wiselin, D. Kanchana and B.S. Sreeja

Method for Fusing Images Based on Different Resolution Remote Sensed Data

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Design of DC-DC Power Converter Using Power Amplifier

¹S. Muthukumar, ²M.C. John Wiselin, ³D. Kanchana and ³B.S. Sreeja

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Key words: Class E power amplifier, power added efficiency, gain, output voltage, rectifier, high frequency applications

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Abstract: In this study a DC-DC power converter design suitable for high frequency applications by using class E power amplifier (Inverter), instead of using small battery values choosing Radio Frequency (RF) values and getting high efficiency of output voltage and maximum of current and voltage values between 0-9 mW of power input in rectifier, the class E power amplifier designed by using GaN HEMT device and the power added efficiency of 64% after getting optimization of matching network and the gain is 14.4 dBm.

INTRODUCTION

Wireless communication using high frequency batteries for laptop, mobile, cellular Wi-Max are used mostly for delivering a power in wirelessly. The wireless system of high frequency power converter gets damaged due to heat dissipation in the system by choosing the proper switching frequency can achieve the good efficiency. Consuming the high frequency and efficiency of the portable device with maximum output and gain is achieved. The process of power converters converts the current from DC-DC converter using the inverter and then the rectifier both are matched by the matching network and the process of inverter is converting direct current to the alternating current and the current flows in reverse direction and the process of rectifier is alternating current to the direct current and the flows in direct way.

The process of power amplifier is considered as the inverter and is shunt capacitance is placed to maintain the high input power and maintains the efficiency and the power is added. The converter of CMOS technology

(Suetsugu and Kazimierzuk, 2008) and the capacitor is used for reducing the power dissipation (Lee *et al.*, 2010) the biasing part mentions the resistor at the gate used to reduce the power loss (Brama *et al.*, 2008) the shunt capacitance is used to satisfy the condition of zero voltage and zero current and zero derivative switching for zero switching, low noise purpose (Deen *et al.*, 2007) the reactance component used to realization of the dual broadband component in the rectifier and achieves the maximum of power current (Garcia *et al.*, 2012) matching network in transmission line using microstrip lines for measuring the current values of developing the determinations used (Garcia *et al.*, 2013) converts the power from RF power to DC power in the rectifier and determining the diode with high switching speed (Chuang *et al.*, 2015) vs. is the switch voltage, C_{j0} is the drain-to-source capacitance at vs equal to 0 and V_{bi} is the built-in potential of the MOSFET (Rivas *et al.*, 2011) the rectifier process achieving developing the value of power and current voltage and input power is 0-9 mW is used.



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INTERACTIVE GPS VEHICLE TRACKING SYSTEM AND SECURITY SYSTEM FOR AUTOMOBILES

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ABSTRACT: In this modern, fast moving and insecure world, it becomes a necessity to be aware of one's safety. Travelling indeed is a pleasure for most of us. Unwary tourists can make easy targets for thieves because they stand out in a crowd, are unused to their surroundings, and generally carry money, credit cards and carry valuables. What if there is a system if the person/people travelling can be tracked and made secure in the case of an emergency? Of course, there is one and this paper discusses on such a system that functions as a tracking, monitoring and a security system - Interactive GPS System (i-GPS) that uses GPS and GSM as main modules.

Key Words: Interactive GPS System, GPS (Global Positioning System), GSM (Global System for Mobile Communication)

I. INTRODUCTION

The interactive GPS system is a GPS based vehicle monitoring and security system. The system uses two main underlying concepts - GPS (Global Positioning System) and GSM (Global System for Mobile Communication). The main application of this system in this context is tracking the vehicle to which the GPS is connected, giving information about its position whenever required and for the security of each person travelling by the vehicle, and assist the user by server data whenever requested. This is done with the help of the GPS satellite and the GPS module attached to the vehicle which needs to be tracked. The GPS antenna present in the GPS module receives the information from the GPS satellite in NMEA (National Marine Electronics Association) format and thus it reveals the position information. This position details are transferred to the server station whenever required. For this we use the GSM Module.

The system also contains advanced vehicle monitoring sensors, user interactive buttons and displays, voice/data transfer facility by the help of GSM/GPRS modem and an accident alert system and anti-theft system too. This is a PIC16F877A based travel aiding device. The user interactive module alerts the low fuel level of the vehicle and informs the nearest fuel station. User can also get the details of hospitals and hotels by pressing buttons.

The server uses Google Map API and VB based application with GSM/GPRS Modem. Server records all the parameters from i-GPS device and interacts with the i-GPS user over network.

II. LITERATURE REVIEW

Ahmed El-Rabbany et al discussed about GPS satellite orbit and new coverage of today's hottest issues, such as precise point positioning and location based services. It addresses all aspects of the GPS, emphasizes GPS applications, examines the GPS signal structure, and covers the key types of measurement being utilized in the field today.

The paper presented by El-Medany, W.; AL-Omaray et al describes a real time tracking system that provides accurate localization of the tracked vehicle with low cost. GM862 cellular quad band module is used for implementation. A monitoring server and a graphical user interface on a website is also developed using Microsoft SQL Server 2003 and ASP.

Dinesh Suresh Bhadane, Pritam B. Bharati, Sanjeev A. Shukla, Monali D. Wani, Kishor & Ambekar A. et al described about a GPS-GSM based tracking system that informs where your vehicle is and where it has been, how long it has been. The system fetches the geographic location and time information from the Global

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Design and Fabrication of Integrated Dual Hydraulic Jacks for Four Wheelers

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Abstract - The objective of this paper is to develop an integrated dual hydraulic jack system in vehicles. In most of the garages the vehicles are lifted by using a separate screw jack. This needs high man power and skilled labours. The intention of this paper is to develop an integrated hydraulic jack system that can be operated by driver from inside the car. The vehicle chassis is fitted with a hydraulic jack system which is operated by a pump that supplies pressurized oil to the hydraulic cylinder. By pressing the button in the dashboard, it activates the hydraulic jack automatically. The paper deals with the guidelines for designing various components used in the integrated hydraulic jack system and the installation of the assembled system to a vehicle chassis. With the use of this system, the vehicles can be lifted from the floor land without application of any impact force. From the test results it is found that the hydraulic jack system performed well according to the present load conditions and can be extended to any static or dynamic load conditions. The motive behind using this system instead of a conventional mechanical system is the more power produced by the system and simple design. Since the hydraulic oil is incompressible so the lifting capacity is more in comparison with the pneumatic system which operates on air.

Keywords: Hydraulic jack, Pump, Actuator, Chassis, Hydraulic Cylinder & pneumatic.

1. INTRODUCTION

The invention relates to hydraulic jack and more specifically to an automobile hydraulic jack system. Tire puncture can be commonly observed nowadays. Car jack comes with vehicles requires users to apply manual force to lift a vehicle. The objective of the paper is to fabricate an integrated hydraulic jack system which will lift the vehicles from floor without application of large force. Pascal's law is the basis of hydraulic drive systems. It states that pressure exerted on a stationary fluid acts equally in all directions.

As a part of this work various journals related to lifting a vehicle were studied and it was found that the presently available systems have some limitations. In this paper we introduced a new concept of lifting a vehicle by designing an integrated hydraulic jack system for four-wheelers. A hydraulic system contains and confines a liquid in such a way that it uses the laws governing liquids to transmit power and do work. The proposed integrated hydraulic jack system consists of hydraulic cylinder, piston, piston rod, cover plate, base plate, connecting hoses, directional control valve, power supply and a fluid reservoir.

The two fluid reservoirs are mounted at the bottom of front and rear chassis and the fluid reservoir is mounted at convenient location and the directional control valve is mounted on the dashboard. When the vehicle is to be lifted in case of repairing, the driver can lift the vehicle by sitting inside the driver's cabin by actuating the push button mounted on the dashboard. When the push button is actuated by the driver, the pressurized oil from the pump enters the hydraulic cylinder and transmits the load to the piston. The vehicle gets lifted as the piston moves in the cylinder.

This paper mainly deals with the design of various components used in integrated hydraulic jack system and the installation of the system in a vehicle chassis.

2. LITERATURE REVIEW

Ademola A. Dare and Sunday A. Oke *et al* described about the design and construction of a low price, simple mechanical jack with wedge mechanism to provide a lift of about 160 mm with a self-locking capability for both small and medium sized vehicles. The design calculations involve the evaluation of applied force required, the screw shaft design, and the lift head design analysis. The fabricated jack was tested on some small and medium vehicles, which resulted in a good lift without any pre-manual lifting.

Amit Tekawade, Jaydeep Wagh, Harshal Nemade, and Pranjal Vartak *et al* investigated in detail about jack with wedge mechanism. An electric motor was integrated with the worm gear jack and the electricity needed for the operation was taken from the battery of the vehicle or already charged battery and thereby the mechanical advantage would be increased, also Remote-control device can also be used to upgrade the model. The worm gear screw jack has ability to be used individually or linked mechanically and driven by electric motors or even manually. It has the lifting capacity of few kilos to the tones of weights with the raising capacity about 3 feet.

Choudhary S., Ravi Kumar D., Pasbola D., and Dabral S. *et al* discussed in detail about development in existing scissor car jack in order to make load lifting easier by utilizing car battery (12V) which can be used in emergency situations. In this design, the cigarette lighter receptacle point is connected in car, which drives the power from the car battery (12V), this will run the DC motor and thus connected power screw is rotated. By this, the car jack will lift the vehicle.

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Implementation of Maximum Power Point Tracking Method in a Photovoltaic System Using HBMO Method

Riyaz A Rahiman and M C John Wiselmy

Abstract:

This paper presents a maximum power point tracking (MPPT) method for photovoltaic system under partial shading conditions using Honey Bee Mating Optimization Algorithm (HBMO). This study deals with the run of a landmass (currents) for maximum power point tracking in solar photovoltaic (SPV) array based on a hybridized DC/DC (Buck-Boost) converter. The primary function of a DC/DC converter is to regulate the power output of SPV array and it also provides the safe and soft starting of the BLDC motor with an inverter (VSI) feeding to a BLDCM. Switching losses of six solid-state of VSI are reduced by the use of low frequency switching signals in electronic construction for the motor. HBMO has a high accuracy in the global optimization and it can provide good dynamic performance and very much convergence rate in automatically switching between exploration and exploitation stages during the MPPT process. Landmass controller reduction in output voltage ripples in the order of mV along with reduced settling time is compared by the conventional PI controller. To verify the performance of the proposed method, several simulations have been carried out in MATLAB/Simulink environment for various shading patterns. The simulation results highlight the accuracy of the proposed scheme for optimal management of the energy available at the output of the photovoltaic panels. In addition, the comparison with the PSO method shows that the proposed method outperforms them in terms of global search ability and dynamic performance.

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Development of Broadband Class E Power Amplifier for WBAN Applications

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Abstract

In this paper, a Class E Power Amplifier (Class-E PA) suitable for Wireless Body Area Networks (WBAN) is proposed. A commercially available RF3931 GaN (gallium nitride) high electron mobility transistor device is used in the proposed design, together with an active harmonic load-pull analysis of the class E mode. The proposed PA utilizes a band pass filter matching network and operates in the frequency range of 6.78MHz to 2.2GHz. The designed PA is fabricated in FR4 substrate and the measurement results are provided. The designed PA provides 78.5% of maximum power efficiency with a fractional bandwidth of 40 while achieving the gain of 10.8 to 14.8 dB. The maximum output power achieved is 42.9 dBw.

Keywords: Broad band power amplifier, Wireless body area networks, Class E Amplifier, Power efficiency.

1 Introduction

Future communication systems are driven by the concept of being connected anywhere at any time. This is not limited to even in medical area. Wireless medical communications assisting peoples work and replacing wires in a hospital are the applying wireless communications in medical healthcare. Power amplifier generally used in electronics items especially in loud speaker and more items but now they used for medical application also. Early they have less efficiency and power of Class E they are not used for the high frequency application. Now they used for broadband applications. Especially for medical application (WBAN) is a sensor that can help to sense the network that can operate automatically and connect to the various application [1] because it is an wireless device that can be connected to wireless network of wearable computing device and for medical use they have lesser weight than the wired appliances and then they can be portable and the devices in smaller in size and easy use also. Class E power amplifier having high efficiency than other power

amplifier, to increase the power efficiency and bandwidth of medical appliances can reduce the power consumption and the process can monitor the patient more accurately. The WBAN have low power radiation [11] and reduces the harmful effects in human body monitoring human body for long time also because they have low power requirement [5]. Class E having short range for high data rates they have more power and accuracy for longer equipments also. WLAN transmitter having low data rates and then they can used for Bluetooth, cellular phones etc.

This paper is organized as follows in two ways: First class E power amplifier design and simulation. Second layout of class E power amplifier for (WBAN) medical applications. The design of class E power amplifier having different steps because every steps determined that efficiency, [7] power and stability measurement and to optimize the power amplifier for increase the efficiency that case used for implementation of the medical applications and the transmitter of class E power amplifier having [12] low power dissipation and the sensor of WBAN used to sense the particular area of human body (affected area) now currently they can used for cancer detection also available by using the WBAN even the smaller area also easily detected because of its accuracy and efficiency. In [6] they use the technologies of MESFET HBT that transistor gives lower efficiency and low breakdown voltage with limitation of output power, [2] they achieved high-efficiency wideband application by using GaN-HEMT power amplifier based on the method of source-pull/load-pull simulation has been used to find optimum source, [3] by using suppressing harmonic powers, and the output network using the transmission line, [4,10] by choosing the proper switching frequency can reduces the unwanted power wastage and improving the efficiency up to 72%. The section can be hardware that can implemented in the

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Design of Class E Power Amplifier Using SXA389BZ for Broadband Applications

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Abstract: Transmitter generally requires a power amplifier at its output stage. Application such as telemetry of biological signals involves low power with low supply voltage into it. Low power circuits used in this transmission application requires larger loads to match with the output with high DC feed inductance when compared to high power amplifiers. Traditional power amplifier design for low power application uses various classes of amplifiers to avoid the output filters that degrade the efficiency. Class-E amplifier is a nonlinear switching type power amplifier which produces high efficiency with the low power consumption. A new design methodology of Class-E power amplifier is proposed in this project which operates to the narrowband and range of 2.4-2.45 GHz and broadband range of 6.78 MHz-2.45 GHz is proposed. In the narrowband design inductance constraint is removed by varying the supply voltage. The broadband model is accomplished by high power and low power transistor. The efficiency of the power amplifier is increased by increasing the order of the input and output matching network. The circuits are simulated using Advanced Design Systems (ADS-2011).

Key words: Class-E power amplifier, gain, output voltage, broadband applications, transistor, ADS

INTRODUCTION

With the increase in the use of hand held communication devices, a high efficiency power amplifier is needed at the transmitter output stage. Low power application circuit generally considered to have low efficiency when compared with high power circuits. Application such as telemetry of biological signals involves low power with low supply voltage into it. Low power amplifier circuits used in this transmission application require larger loads to match with the output with high DC feed inductance when compared to high power amplifiers. Thus, the power amplifiers designed for low power application has lower efficiency than high power circuits.

Power Amplifier (PA) is very challenging to researchers as it requires for providing high power with high efficiency. PA is generally a DC to AC converter which is driven by its input signal (Suetsugu and Kazimierczak, 2008). During last few years, the field of interest of microwave design has shifted to monolithic circuit from the arena of hybrid components (Lee *et al.*, 2010) this reduces the cost of power amplifier. This change is due to the advancement of semiconductor technology which makes the monolithic design to be

circuits are selected by system requirement (Brama *et al.*, 2008; Deen *et al.*, 2007) other cause is that all RF and microwave designs can easily be implemented by CAD methods improves the circuit modeling techniques. These changes make the Microwave Monolithic Integrated Circuits (MMIC) to be "Time to market". Class-E power amplifier provides high efficiency topology (Gracia *et al.*, 2013; Chuang *et al.*, 2015). Class-E amplifier is a non linear switching type power amplifier makes transistor to act as a switch. V_s is the switch voltage (Rivas *et al.*, 2011), C_{D0} is the drain-to-source capacitance at V_s equal to 0 and V_{th} is the built-in potential of the MOSFET (Kazimierczak and Jozwik, 1989) the rectifier process achieving developing the value of power and voltage current and power input is 0.15 mW is used.

POWER AMPLIFIER DESIGN

The design values are based on the analytical derivation of ideal Class-E PA. The proposed circuit is designed in order to increase the efficiency of the circuit. From Fig. 1 instead of RF Choke the DC feed inductance is used, so that, the constraint produced by the inductance (L_0) in the conventional class-E PA is relaxed. The aim of the design work focus on optimization of high




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Segmentation of chondroblastoma from medical images using modified region growing algorithm

P. Y. Muhammed Anshad , S. S. Kumar & Shajeem Shahudheen

Cluster Computing **22**, 13437–13444 (2019)

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Abstract

Chondroblastoma is a bone tumor typically found within the cartilage tissue space of bone and unfolds into its surroundings. This tumor reduces the strength of bone and even leads to death if not treated early. Chondroblastoma is diagnosed from X-ray images and the tumor can be removed by surgical methods. For the successful removal, the exact volume of tumor should be known, which can be identified by segmenting the tumor region from the image. Chondroblastoma can be segmented from X-ray image by manual and computer aided methods. Manual segmentation may leads to inter and intra observer errors. This work proposes an efficient segmentation tool called modified region growing method for segmenting chondroblastoma. This work focuses on automatic and accurate segmentation of chondroblastoma which gives better segmentation results than existing methods.



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Optimum soft mask for monaural speech separation system

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Abstract

Monaural speech separation aims to separate the target speech from speech mixture recorded by single mike. The ideal binary mask (IBM) has been projected as a procedure goal in computational auditory scene analysis (CASA) based monaural speech separation. The IBM is essentially a matrix of binary numbers, the binary value 1 is allotted to the mask if the native signal-to-noise ratio (SNR) of a specific time-frequency (T-F) units exceeds the native criterion (LC) otherwise the value 0 is allotted to the mask. The IBM based speech synthesis could discard some components of the speech and leads to associate unnatural sound known as musical noise. This analysis work proposes the optimum soft mask (OSM) as an alternate to IBM to cut back the musical noise, by commutation the arduous limiting weights (i.e. 1 or 0) with the variable weights between 0 and 1. The IEEE speech corpus and NOISEX92 noises are went to appraise the performance of projected optimum soft mask in terms of signal-to-noise ratio (SNR) and also the sensory activity analysis of speech quality (PESQ). The experimental results indicate the superior performance of the projected optimum soft mask as compared to the IBM and ideal multi-threshold mask (IMM) within the context of monaural speech separation.

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DESIGN SIMULATION AND ANALYSIS OF CLASS E POWER AMPLIFIER

Research Paper

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ABSTRACT

A new design methodology of Class E power amplifier is proposed in this paper which operates to broadband range of 6.78MHz-2.45GHz. The Broadband model is accomplished by high power and low power transistor. The Efficiency of the power amplifier is increased by increasing the order of the input and output matching network. A GaN-HEMT transistor is used for the high power, which is carefully modelled and characterized to prescribe the optimal output impedance for the broadband Class-E operation. GaAs HBT is used for low power design. The circuits are simulated using Advanced Design Systems (ADS-2011).

1 INTRODUCTION

A power amplifier is an amplifier, which is capable of providing a large amount of power to the load such as loudspeaker, or motor. It is essential in almost all electronic systems where a large amount of power is supplied to the load. The power amplifier is used as a last stage in as electronic systems. The PA is more commonly known as audio amplifier. It will be interesting to know that a power amplifier does not actually amplify the power. But indeed it takes power from the d.c power supply connected to the output circuit and converts it into useful ac signal power. The power is fed to the load. The type of ac power developed at the output of a power amplifier, is controlled by the input signal. Thus it is said that power amplifier is a dc to ac power converter whose action is controlled by the input signal. The power amplifiers are also known as large signal amplifiers. This term is used because these amplifiers use a large part of the ac load line for operation.

Design of the art of Microwave Power Amplifier (PA) is very challenging to researchers, as it requires for providing high power with high efficiency. PA is generally a dc to ac converter which is driven by its input signal. During last few years, the field of interest of microwave design has shifted to monolithic circuit from the arena of hybrid components; this reduces the cost of PA. This change is due to the advancement of semiconductor technology which makes the monolithic designs to be delivered in the hardware as they are manufactured in bulk numbers. Thus the substrates employing monolithic circuits are selected by system requirements. The other cause is that all RF and Microwave Designs can easily be implemented by CAD methods, which improves the circuit-modeling techniques. These changes make the Microwave Monolithic Integrated Circuits (MMIC) to be "time to market". Few applications involving large active element of phased array antenna design considers "efficiency" to be an important factor. Handheld communicating equipment has PA in the transmitter output stage. This application translates high efficiency by low power consumption, less heat dissipation, and smaller size. Researchers spurred interest on Class-E PA, which provides high efficiency topology. Class-E amplifier is a nonlinear switching type PA makes transistor to act as a switch. The design of MMIC generally employs Advanced Design System (ADS) simulator for simulation of circuits.

With the increase in the use of hand held communication devices, a high efficiency power amplifier is needed at the transmitter output stage. Low power application circuit generally considered to have low efficiency when compared with high power circuits. Application such as telemetry of biological signals involves low power with low supply voltage into it. Low power PA circuits used in this transmission application require larger loads to match with the output, with high DC feed inductance when compared to high power amplifiers. Thus the power amplifiers designed for low power application has lower efficiency than high power circuits. In concern with the above application, the motivation of this research is to design a power amplifier with high efficiency and low power consumption. This is accomplished by Class-E PA designs which provides high efficiency irrespective high power or low power applications.

The following are the reasons to choose class E PA.

- The class E amplifier is designed to provide high efficiency, and it is typically used at high frequencies. The class E amplifier uses an inductor to connect to the supply voltage, and a shunting capacitance across the switch to shape the standard waveforms for both voltage and current and decrease the power loss, thus, providing a better efficiency than Class D at high frequency. Compared to Class D, it is also less sensitive to the transition time of the switch.
 - Class E power amplifiers can be designed with a small size, light weight and relatively tolerance to circuit variation.
 - Furthermore, class E amplifier can be designed depending on the demand, such as specific frequency, narrow band operation.
 - Similar to Class D, all class E power amplifiers are called power converters.
- In these circuits, the driving signal causes switching of the transistor, but there is no relationship between the amplitudes of the driving signal and the output signal.

Thus these makes the choice of selecting Class E amplifier over other Classes of operation. As the project aims in achieving the high efficiency of PA the option of Class E is the better choice for the work to be carried out. The proposed work has Class E PA for providing high efficiency to the low power application.

Fixed Frequency Sliding Mode - PI Control for Single Phase Unipolar Inverters

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Abstract - Sliding Mode- PI controller is recognized as robust controller with a high stability in a wide range of operating conditions, although it suffers from chattering problem. In addition, it cannot be directly applied to multi switches power converters. This paper concerns a sliding controller design with the proportional-integral (PI) control form. First, a theoretical analysis of the considered sliding PI controller is provided. Our analysis reveals that the proportional control term of the sliding PI controller, i.e., sliding proportional controller, can reduce the chattering problem and thus, the robustness can be established. Second, the chattering problem is eliminated by smoothing the control law in a narrow boundary layer, and a pulse width modulator produces the fixed frequency switching law for the inverter. The smoothing procedure is based on limitation of pulse width modulator. Therefore, the chattering problem of the proportional gain is resolved and the valuable robust control property of the sliding integral controller is illustrated again. The simulation model has been developed and tested using MATLAB software.

Keywords: Pulse width modulator, Sliding PI control, Unipolar single phase inverter

1. INTRODUCTION

Now-a-days, single-phase pulse width modulation(PWM)-based inverter (see Fig. 1), which is used in uninterruptible power supply (UPS), should supply nonlinear and critical step loads. Since the inverter output impedance is not zero, these loads can deform the sinusoidal output voltage of the inverter. According to the IEEE Standard 1547, the total harmonic distortion (THD) of the output voltage must be less than 5%, especially for nonlinear load. Table I shows the standard details for maximum

acceptable harmonic voltage distortion. For inverters with 50-Hz output voltage frequency and its switching frequency higher than 2 kHz, low-frequency harmonics (2nd to 13th) should be rejected by a closed-loop controller perfectly. Moreover, the controller must perform a good regulation of the output voltage against the abrupt variations of the input voltage, output current, and the reference voltage. These demands imply to use a fast controller with good dynamic response for the inverters.

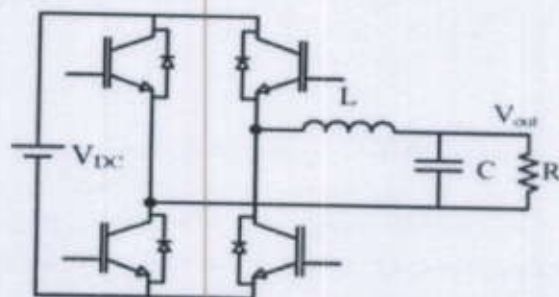


Fig. 1. PWM-based single-phase inverter.

TABLE I IEEE STANDARD 1547 FOR MAXIMUM ACCEPTABLE HARMONIC VOLTAGE DISTORTION

Individual Harmonic order	$h < 11$	$11 \leq h < 17$	$17 \leq h < 23$	$23 \leq h < 35$	$35 \leq h$	Total Harmonic Distortion
Percent (%)	4.0	2.0	1.5	0.6	0.3	5.0

Recently, many control methods, like repetitive control, deadbeat control, multi loop feedback, hysteresis current mode control, and internal model control, have been proposed to achieve the aforementioned demands. Occasionally, nonlinear observer and harmonic elimination techniques are employed to improve the transient response. It is noticeable that these control methods are based on average model (small signal model) of the inverter, because



POWER CONVERTER DESIGN USING POWER AMPLIFIER

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May 23, 2018

Abstract

In this paper, power converter is achieved by using the power amplifier. The power amplifier is an inverter and the process of amplifier converts the DC to AC signal, the inverter designed by using the transistor of RF3931 and achieves the steps for testing the transistors range verified and the HSMS2862 rectifier used for high switching frequency and converts AC to DC signal and for high output voltage compare to inverter the rectifier achieves high output voltage to develop for very high frequency applications and the matching circuits developed to matches the inverter and rectifier. The resultant measurement of power converter achieves 60dBm output voltage.

Key Words: Class E Power Amplifier; Rectifier HSMS2862-2000301 ; Switching Frequency, Very High Frequency.



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Comparative Performance Study of Class E Power Amplifier with Series and Shunt Filter at Quarter Wave Line

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Rathy Shankar, M. Wiselin • Published 2016

The quality of the wireless communication system requires demand for compact, low-cost, and low power transportable transceivers has augmented dramatically. Among the transceiver's building blocks is that the power electronic equipment. Thus, there's a desire for low-priced power electronic equipment. It's necessary to think about the MOSFET gate-to-drain capacitance for achieving the class-E ZVS conditions. As a result, the ability output capability and therefore the power conversion potency are full of the MOSFET gate-to-drain capacitance. The waveform obtained from ADS simulations and circuit experiments showed the quantitative agreements with the theoretical predictions. Keyword: Power amplifier, ZVS, MOSFET, ADS Collapse

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CASA FOR IMPROVING SPEECH INTELLIGIBILITY IN MONAURAL SPEECH SEPARATION

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Abstract

Speech separation is the process of separating the target speech and noise from the noisy speech mixture. Speech separation algorithms are useful in improving the quality and intelligibility of the speech. The various traditional speech separation algorithms such as spectral-subtractive algorithms, Wiener filtering, statistical model-based methods and subspace algorithms are mainly focus on improving the speech quality. But there are applications such as mobile communication, air ground communication and hearing aids, needs speech intelligibility than speech quality. In order to satisfy the requirements of intelligibility, this work proposes an algorithm using Computational Auditory Scene Analysis (CASA) and Support Vector Machine (SVM) to separate the noisy speech into target speech and noise and at the same time improves the speech intelligibility. The proposed algorithm decomposes the clean speech and noise into time-frequency units (T-F) and computes the energy from each frame of clean speech and noise to train the SVM. Latter in the testing phase, the trained SVM is used to estimate the binary mask from the energy of the noisy speech based on whether each T-F unit is dominated by speech or noise. The estimated mask by SVM is used to synthesize the speech signal and is presented to normal-hearing listeners with different age groups to measure the performance of the proposed algorithm. The experimental results show substantial improvements in recognition score because the separated speech has reasonable speech intelligibility.

Keywords: Computational Auditory Scene Analysis (CASA); Support Vector Machine (SVM); Time-frequency units (T-F)

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1. Introduction

In a real scenario, when a person is speaking, his speech is getting affected by various types of noise such as car noise, train noise, restaurant noise and sometimes speech from other person speaking. For an effective speech communication, these unwanted noises have to be separated. Speech separation is a process of separating the speech and noises from the noisy speech mixture. The traditional speech separation algorithms mainly focus on improving the speech quality rather than speech intelligibility [1]. Speech intelligibility is defined as the clear understanding of the content of spoken words. This plays a vital role in variety of applications such as mobile phone, air ground communication and hearing aids. As the traditional speech separation algorithms fails to separate the noise from noisy speech and improve speech intelligibility, this work propose a new model based CASA for speech separation. Since CASA mimic human auditory scene analysis by computational means [2],[3], this paper adopts model based CASA to discard noise from the noisy mixture and improve intelligibility.

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