Abstract of Published Papers

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CENTER FOR RESEARCH AND TRAINING
2007

PREFACE

It is my pleasure once again to write this note to introduce to you the second volume of the Abstract of Published Papers. The Abstract of Published Papers is an annual production of the East West University Center for Research and Training (EWUCRT) with an objective to keep an official log of academic publications of the faculty members of East West University. It includes the abstract of published research articles, book chapters, books, and also conference papers of our colleagues.

This year (2007), a total of 56 research articles, books/chapters and conference publications were completed by our academic members. Of them 22 are published papers in national and international journals, 3 are in books, 1 is a working paper and the rest 30 are conference publications. East West University is a young university with a total of 116 full-time faculty members in its three academic faculties: the Faculty of Business and Economics, the Faculty of Liberal Arts and Social Sciences and the Faculty of Sciences and Engineering. Considering these, it is a significant achievement. Congratulations!

In terms of classifications of the publications according to national and international appearances, 17 are in international journals and 5 are in national journals. At the same time, among the conference papers, 24 are in international conferences held outside Bangladesh and 6 are in conferences held in Bangladesh.

From the Faculty of Sciences and Engineering, Professor Anisul Haque, and Professor Md. Kamrul Hasan had 8 research publications each in 2007, Professor Md. Mozammel Huq Azad Khan had 6 research publications, Professor Abu Saleh Abdun Noor and Professor Mohammed Ruhul Amin had 5 publications each in 2007. There are few others who had more than one publication in 2007 from this faculty too. They are: Dr Khairul Alam, Syed Akhter Hossain, Feroz Anwar, Syed Murtuza Baker, Taskeed Jabid and Dr. Md. Ishfaqur Raza. From the Faculty of Liberal Arts and Social Sciences, Harunur Rashid Khan and Dr. Muhammed Shahriar Haque had more than one publication in 2007. From the Faculty of Business and Economics, Professor Tanbir Ahmed Chowdhury and Professor Nazrul Islam had more than one publication in 2007.

Congratulations to all of you! Great job.

Finally, Ms Farha Naz completed this job single-handedly and she has done a wonderful job within a very short period of time. I thank her for her work and I remain grateful to her for her patience to deal with me.

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BUSINESS AND ECONOMICS

Corporate Governance in Bangladesh: Some Observations

A.A. Mahboob Uddin Chowdhury**, Tanbir Ahmed Chowdhury****

Abstract

Nowadays corporate governance is highly valued on the corporate agenda worldwide. With the growth of globalization, the stakeholders from home and abroad have become increasingly demanding about more transparent and reliable accounts, fair treatments, protections and updates on the company's progress. This has put moral pressure on boards to be completely transparent and accountable to the stakeholders. This paper focuses on the different aspects of corporate governance with special emphasis on the corporate governance structures of Bangladesh. It is observed that the manifestation of a nonperforming regulatory framework is nowhere as evident as in the financial sector of Bangladesh. Moreover, there exist regulatory loopholes and weaknesses in the regulatory framework regarding methods of stock trading, financial reporting, protection of shareholders and the like. In Bangladesh, banks and firms are not interdependent, where industries rely heavily on banks as a stable source of finance; in turn, banks depend on firms as stable sources of loan demand. It can be argued that financial structure, institutional environment and financial institutions and their linkage with firms is not playing an important role in corporate governance and in mitigating agency conflicts and costs in Bangladesh. It would be wise for policy makers and corporate boards in Bangladesh to work towards institutionalizing and standardizing governance principles for corporate bodies in Bangladesh to address the existing governance problem and to ensure healthy corporate environment that will accelerate the economic wheel of the country in future.

Key Words: Corporate governance**,** agency conflict, agency equity cost, agency debt cost Generally Accepted Accounting Principles (GAAP)

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Stock Markets Behavior in Bangladesh

Tanbir Ahmed Chowdhury*

Abstract

In the process of economic development, stock markets play a pivotal role in channeling funds from the surplus unit to the productive (deficit) units. Stock markets provide adequate finance to the entrepreneurs. In recent years with the changing economic climate, the Government of Bangladesh has emphasized the development of stock markets in the country. Government is also trying to develop the stock markets through different policy measures, even though the rate of development is not up to expectation. Thus, the situation warrants detailed examination of the stock markets of Bangladesh and drawback in the system need to be point out.

In this paper we tried to analyze the development and growth of stock exchanges and Securities and Exchange Commission (SEC) of Bangladesh. For evaluating the stock market performance data has been analyzed through the various statistical measures like growth percentage, average growth, trend equations, square of correlation coefficient & correlation matrix for Dhaka Stock Exchange (DSE) & Chittagang Stock Exchange (CSE). The paper also briefly describes some of the problems of Bangladesh stock market such as, inactive stockbrokers, non-existence of market makers, kerb trading, malpractice's of companies, non-transparency of the deals, poor performance of Securities and Exchange Commission (SEC) etc. In order to overcome the problems a few suggestions for reform based on sound reasoning are given by the author.

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Negotiation Skills: Study of Male and Female Managers

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Abstract

The universal characteristics of business negotiation skills are explored using a sample of 57 elements (40 male and 17 female) in order to measure the skill of negotiators in handling different negotiation situations. Both theoretical and empirical measurement issues have been considered using structural equations as the primary data analysis approach. The specific objectives of the research are to, *inter alia*, measure the gender effects on negotiation, the variation in success rate between male & female negotiators, and to identify the important negotiation skills practiced by both male & female negotiators. The study concludes that gender variation does not exist in view of different negotiation skills. Although the study reveals that there is a variation in the success rate between male and female managers. And finally we can see that male negotiators consider knowledge of the detailed subject matter as the most effective tool for negotiation, whereas female negotiators believe interactive skill is the most effective negotiation skill.

Key Words: Negotiation Approach, Skills, Gender

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State of Corporate Governance in Bangladesh: Analysis of Public Limited Companies- Financial, Non-Financial Institutions and State Owned Enterprises

A. K. Enamul Haque*, Mohammad Beroz Jalil**, Farha Naz***

Abstract

Corporate governance (CG) is an important effort to ensure accountability and responsibility and is a set of principles, which should be incorporated into every part of the organization. This study focused on the state of Corporate Governance (CG) in three sectors of the economy: the private company (public-listed company), the financial enterprises, and the State Owned Enterprises (SOEs). To understand the state of CG, three broad aspects of governance and management issues were studied. These are: a) shareholders' rights, b) public disclosure of information, c) effectiveness of the Board. Within each of these many sub-categories were studied which were discussed in this paper. The study used interviews with key stakeholders, experts and executives of these types of companies, a questionnaire survey and also group discussions.

In terms of the three sectors, this study found that public-listed companies are more open to their shareholders with respect to shareholders rights and disclosures of information. With regards to public disclosure of information and transparency, companies use "box checking" method rather than understanding the spirit of the disclosure. On the issue of the active participations of the independent directors SOEs had a better rating than others. In public limited companies study found that in 40% of the cases independent directors rarely disapproved the agenda placed in the board. In the best practice guidelines of CG three major committees are recommended, study found other than SOE, financial and non-financial institutions are not complying with the best practices.

Keywords: State-Owned Enterprise, RAFT, FAT, Corporate Governance, Financial Institutions, Non-Financial Institution.

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Service Quality of BRAC Bank in Bangladesh: A Case Study

Nazrul Islam*, Md. Arif Billah Ibne Tareq **

Abstract

This paper attempts to identify the service quality of BRAC Bank of Bangladesh. It identifies the service quality factors important to the Bank. A survey has been conducted among the clients of BRAC Bank with a structured questionnaire. The respondents' were selected from the 14 branches of BRAC Bank located at Dhaka city. More than 200 retail customers were surveyed for this study. The sample clients were selected randomly at the branches. Factor analysis was conducted to identify the service quality factors of the bank. The relationship between the service quality factors and the overall service quality was also explored in this study. Results show that the most important perceived service quality factor is the fulfillment of the clients' best interest to the bank. The second important service quality factor of the clients is the tangible physical facilities. In order to provide quality service to the clients, BRAC bank should focus more on these factors.

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Service Quality of Private Passenger Vehicles in Dhaka City: A Passenger Satisfaction Model

Mahmudul Haq**, Nazrul Islam****

Abstract

The use of different modes of private passenger vehicles (PPVs) such as, yellow cab, black cab, CNG auto rickshaw etc. is very essential for the dwellers of Dhaka city. These private vehicles are running at the streets of Dhaka City for over last five years. City dwellers have no other way out, as the vehicles in government sector are extremely inadequate. Thus, the question of passengers' satisfaction often receives least attention to the concerned persons. However, if the situations are improved, these vehicles will make important contribution to the economy and will reduce time of the passengers wasted by the commuters in traffic congestion. The deteriorated situation can be improved by addressing the quality attributes of the vehicles, drivers and monitoring systems as well. Hence, this study attempts to identify the quality attributes of PPVs, which are very much concerned with the satisfaction of the passengers. Sophisticated statistical techniques like factor analysis and multiple regressions were used to identify the key quality attributes. Results show that there are six quality factors such as vehicle quality, driving quality, comfort, friendliness, complain-handling, and monitoring concerned with the satisfaction level. It also shows that the passengers' satisfactions are significantly related to the quality of the vehicles and the drivers, friendliness of the driver, complain-handling, and monitoring of the vehicles. The positive change of these factors can increase the level of satisfaction of the passengers commuting in Dhaka City.

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LIBERAL ARTS AND SOCIAL SCIENCES

Teaching Pronunciation: Does It Matter?

Md. Zahid Akter*

Abstract

English language syllabi and evaluation often center on macro-language skills (such as writing and speaking) ignoring the underlying micro-skills (such as pronunciation) required to reach the goal. The need for students' oral competency is talked about but not realistically aimed at. Textbooks frequently lead to oral communication practice but to attain the objective, specific tasks of pronunciation are rarely made explicit. Paradoxically, we usually show a considerable sensitivity to a person's skills in this area. Good pronunciation is highly appreciated and bad pronunciation immediately leads us to call one's overall proficiency in English into question. In this context, I argue in favor of teaching pronunciation while incorporating some popular debates in this regard.

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Problems of Oral Communication in English Among Bangladeshi Students

Harunur Rashid Khan*

Abstract

In the mainstream institutional contexts of Bangladesh, students do not have much scope to practice English outside their classrooms. The lessons they have in the classes are not enough to help them speak English effectively. Although English is a compulsory subject from the primary to the higher secondary level of education, students are not sufficiently exposed to opportunities for speaking English. As a result, many students do not possess adequate oral communication skills in English. In the current competitive job market, communication skill is an imperative for any good career, both in national and international settings. It is generally assumed that shyness, pronunciation difficulty, inadequate knowledge of grammar and inappropriate use of vocabulary items badly affect learners' oral communication. The present study aims at spotting different kinds of problems of spoken English of Bangladeshi students with a view to suggesting some possible ways and means to overcome them.

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All Malaysians are Equal, but Some Malaysians are More Equal than Others

Muhammad Shahriar Haque*

Abstract

This paper examines the practice of exclusion in recruitments advertisements, which if not acknowledged and checked may inhibit the smooth progression of the development of this nation towards achieving *Vision 2020*. From a linguistic perspective, analysing the discourse of recruitment advertisements is significant in the sense that it reflects an aspect of the social practices of this society. This seems to pave the way for the concept that there is a relationship between discourse and society, more specifically, linguistics and social structure. This paper, from a critical discourse analyst's perspective, explores the perceptions and practices of the contemporary (Malaysian) society in relation to the 'practice of exclusion' in recruitment advertisements.

Keywords: Malaysian, exclusion, advertisement, Vision 2020, critical discourse

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Consumer Protection in Recruitment Advertisements: The Malaysian Scenario

Muhammad Shahriar Haque*

Abstract

In order to propagate the ideology of the *Rukunegara* and fulfil the dreams of *Vision 2020* of becoming a fully developed country, one of the major concerns that Malaysia needs to deal with is the issue of 'equal employment opportunity' for everyone. If one opens a newspaper and takes a glance at the recruitment or classifieds sections, it becomes quite apparent that despite the equal employment opportunity laws, there does not seem to be any 'healthy practice' of such laws or policies in the Malaysian context. The significance of the underlying social issue is that not everyone is given (equal) opportunity of applying for jobs; this itself is a basic violation on one's fundamental rights. The issue is of concern as it excludes potential job applicants from applying for certain positions and depriving them of the opportunity of showing their ability to do a job. As a result, it seems that there is not only an imbalance in the distribution of wealth in the nation but also the fact that having the right qualification or experience / expertise does not ensure the right kind of job. The objective of this paper is two folds, to emphasize the lack of consumer protection in terms of recruitment advertisements, which seems to marginalize certain applicants, and to present findings of a study which substantiates that exclusionary discourse is being used to restrict potential applicants from applying for certain positions being advertised.

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ELT Training in Bangladesh: Problems and Prospects

Harunur Rashid Khan*

Abstract

There has been a noticeable trend of ELT training programs being funded and administered by the government, different NGOs, local and foreign agencies and professional institutions across the country. This paper aims at focusing on the present state of ELT training in the country, its strengths and weaknesses and future directions.

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SCIENCES AND ENGINEERING

Electronic Properties of Carbon Nanotubes Calculated From Density Functional Theory and the Empirical π-Bond Model

Deep Shah*, Nicolas A. Bruque*, **Khairul Alam**,** Roger K. Lake*, Rajeev R. Pandey*

Abstract

The validity of the DFT models implemented by FIREBALL for CNT electronic device modeling is assessed. The effective masses, band gaps, and transmission coefficients of semi-conducting, zigzag, $(n, 0)$ carbon nanotubes (CNTs) resulting from the *ab-initio* tight-binding density functional theory (DFT) code FIREBALL and the empirical, nearest-neighbor π-bond model are compared for all semiconducting n values $5 \leq n \leq 35$. The DFT values for the effective masses differ from the π-bond values by ±9% over the range of n values, $17 \leq n \leq 29$, most important for electronic device applications. Over the range $13 \leq n \leq 35$, the DFT bandgaps are less than the empirical bandgaps by 20– 180 meV depending on the functional and the n value. The π-bond model gives results that differ significantly from the DFT results when the CNT diameter goes below 1 nm due to the large curvature of the CNT. The π-bond model quickly becomes inaccurate away from the bandedges for a $(10, 0)$ CNT, and it is completely inaccurate for $n \leq 8$.

Keywords: FIREBALL · CNT · DFT · NEGF · Bandstructure

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Performance Metrics of a 5 nm, Planar, Top Gate, Carbon Nanotube on Insulator (COI) Transistor

Khairul Alam*, Roger Lake**

Abstract

The performance of a planar, 5 nm top gate, carbon nanotube on insulator (COI) field-effect transistor (COIFET) with source/drain underlaps is analyzed. The performance metrics of switching delay time and cutoff frequency are calculated. A 2 nm thick, relatively low-K, SiO2 gate dielectric combined with a source/drain underlap geometry and insulating substrate minimizes the parasitic gate to source GS and gate to drain GD capacitances and results in a 23 fs switching delay time. The simplicity of the device design is required to satisfy the constraints of a self-assembly process. The device analyzed is also a scaled version of recently demonstrated CNTFETs on sapphire.

Index Terms*:* Carbon nanotube, carbon nanotube on insulator, field effect transistors, gate underlaps, top gate.

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Role of Doping in Carbon Nanotube Transistors with Source/Drain Underlaps

Khairul Alam*, Roger Lake**

Abstract

The effects of doping on the performance of coaxially gated carbon nanotube (CNT) field-effect transistors for both zero Schottky-barrier (SB) and doped carbon nanotube contacts are theoretically investigated. For ultrascaled CNTFETs in which the source/drain metal contacts lie 50 nm apart, there is no MOSFETlike contact CNTFET (C-CNTFET) with an acceptable on/off current ratio using a CNT of diameter 1.5 nm and a source/drain voltage 0.4 V. For CNTFETs with source/drain metal contacts either 50 nm or 100 nm apart, there is an optimal doping concentration of 10 3 dopants per atom. The maximum on/off current ratios for the 50 nm CNT/5 nm gate and the 100 nm CNT/10 nm gate SB-CNTFETs are 5 104 and 6 105, respectively. Performance metrics of delay time, cutoff frequency, and *LC* frequency are presented and compared.

Index Terms—Doped carbon nanotube, doped source/drain contact, field effect transistor, source/drain underlap, zero Schottky barrier contact.

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An Analytical Model for Electrostatics of Strained-Si n-Type Metal-Oxide-Semiconductor Devices

A. N. M. Zainuddin**, Anisul Haque****

Abstract

We propose a semiclassically based analytical model for electrostatic properties of strained-Si (SS) n-type metal-oxide-semiconductor (MOS) devices. Our model explicitly incorporates the discontinuity of the dielectric constant across the SS/SiGe interface. The model is applied to calculate the threshold voltage reduction in SS devices. Comparison with results from an accurate, self-consistent, quantum-mechanical model, as well as with published experimental data, demonstrates that the predictions from the proposed analytical model are accurate provided that the SS layer is not too thin, and the Ge content in the SiGe buffer layer is not too high.

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Analysis of Compressively Strained GaInAsP/InP Quantum Wire Electro-Absorption Modulators

A. M. Sonnet*, M. A. Khayer**, **Anisul Haque***

Abstract

Performance of compressively strained (CS) GaInAsP–InP quantum-wire (QWR) electro-absorption modulators (EAMs) is theoretically studied using an eight-band k.p model. An empirical relationship is proposed for the quantum-con-fined Stark shift in QWR EAMs. The accuracy of this relationship is verified by comparing with numerical data. The effects of the variation of different device parameters on the absorption spectra are investigated. The absorption peaks are found to be stronger in narrower QWRs with strain-compensating barriers. Comparison of the extinction ratio with that of similar quantum-well EAMs show that, in spite of the lower in-plane filling factor, QWR EAMs exhibit a higher extinction ratio. Effect of fluctuation of wire width on the absorption spectrum of QWRs has been studied. The proposed QWR EAMs are suitable for photonic integrated circuits (PICs) fabricated by electron-beam lithography, reactive-ion etching, and two-step epitaxial growth. Due to the nature of the integration in such structures, the QWR EAMs are not required to be polarization-insensitive. On the contrary, the QWR EAMs are naturally tuned to the polarization of the output of the CS QWR lasers, fabricated on the same PIC, leading to an enhancement of the absorption strength. Moreover, the QWR EAMs, integrated with QWR lasers, offer low insertion loss.

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Effect of Elastic Strain Redistribution on Electronic Band Structures of Compressively Strained GaInAsP/InP Membrane Quantum Wires

F. Ferdous***, Anisul Haque****

Abstract

The effect of redistribution of elastic strain relaxation on the energy band structures of GaInAsP/InP compressively strained membrane quantum wires fabricated by electron-beam lithography, reactive-ion etching and two-step epitaxial growth is theoretically studied using an 8-band k· p method. Anisotropic strain analysis by the finite element method shows that due to etching away the top and the bottom InP clad layers in membrane structures, redistribution of strain occurs. It is found that strain redistribution increases the effective bandgap of membrane quantum wire structures causing a blueshift of the emission frequency. Comparison with effective bandgap calculations neglecting confinement and band mixing demonstrates that neglect of these effects leads to an overestimation of the change in the bandgap. We have also investigated the effect of variation of wire width, barrier strain compensation, number of stacked quantum wire layers, and thickness of the top and the bottom residual InP layers in membrane structures on the change in the effective bandgap of membrane structures.

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On the Physically Based Compact Gate C-V Model for Ultrathin Gate Dielectric MOS Devices using the Modified Airy Function Approximation

M. Itrat B. Shams*, K. M. Masum Habib*, Q. D. M. Khosru *, A. N. M. Zainuddin**
Anisul Haque*

Abstract

The exponent (λ) of the modified Airy function solution of the quantized energy levels in the MOS potential well, which is used in the physically based quantum-mechanical compact gate C–V model of Li et al., has been found to be dependent on the barrier height at the Si–dielectric interface and the substrate doping density. The physical origins of this dependence are discussed. An empirical equation that considers these effects is proposed for λ. Comparison with the experimental C–V data of MOS devices with high-k gate dielectrics shows that inclusion of these effects in the compact C–V model of Li et al. is necessary for the accurate simulation of MOS field-effect transistors with high-k gate dielectrics.

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Variable Step-size Multi Channel Frequency-Domain LMS Algorithm for Blind Identification of Finite Impulse Response System

M. A. Haque**, M. K. Hasan****

Abstract

The choice of step-size is a critical factor in blind identification of single-input multi-output (SIMO) systems using adaptive multichannel frequency-domain least-mean-squares (MCFLMS) algorithm. The proper step-size is dependent on the signal power and it influences the speed of convergence as well as the final misalignment error. Applying normalized MCFLMS (NMCFLMS) algorithm the dependency of step-size parameter on the signal power can be eliminated, however, we show that even for a moderate SNR, the algorithm fails to converge to the eigenvector corresponding to the minimum eigenvalue of the data correlation matrix and hence misconverges to a fictitious solution. We propose a self-adaptive variable step-size MCFLMS (VSS-MCFLMS) algorithm which optimizes the performance of the algorithm in each iteration in order to achieve minimum misalignment with the true channel impulse response. We perform the convergence analysis of the proposed algorithm and show that the VSS-MCFLMS algorithm converges, both in noise-free and noisy conditions, to the eigenvector corresponding to the minimum eigenvalue and therefore more noise robust as compared to the NMCFLMS. We also show that the algorithm shows optimal speed of convergence in noise-free case and the proposed variable step size guarantees the stability of the algorithm. Simulation results are presented to demonstrate that the proposed VSS-MCFLMS algorithm gives lower final misalignment as compared to the NMCFLMS algorithm without sacrificing the speed of convergence and computational efficiency.

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Energy Constrained Frequency-Domain Normalized LMS Algorithm for Blind Channel Identification

M. A. Haque*, M. S. A. Bashar*, P. A. Naylor**, K. Hirose***, **M. K. Hasan***

Abstract

This paper deals with the blind adaptive identification of single-input multi-output (SIMO) finite impulse response acoustic channels from noise-corrupted observations. The normalized multichannel frequency-domain least-mean-squares (NMCFLMS) algorithm [1] is known to be a very effective and efficient technique for identification of such channels when noise effects can be ignored. It, however, misconverges in presence of noise [2]. In this paper, we present an analysis of noise effects on the NMCFLMS algorithm and propose a novel technique for ameliorating such misconvergence characteristics of the NMCFLMS algorithm for blind channel identification (BCI) with noise by attaching a spectral constraint in the adaptation rule. Experimental results demonstrate that the robustness of the NMCFLMS algorithm for BCI can be significantly improved using such a constraint.

Keywords: Blind channel identification - NMCFLMS algorithm – Misconvergence -Energy constraint - Robustness

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Acoustic Classification of Bangla Vowels

Syed Akhter Hossain*, M. Lutfar Rahman **, Farruk Ahmed***

Abstract

In this paper, we examined acoustic aspects of Bangla vowels for the purpose of the classification based on the experiments with Bangla disyllabic word pairs. This covered all the Bangla vowels for both male and female speakers in which the first vowel was preceded by a consonant having voiceless variant to avoid coarticulatory effect in the resultant study. We segmented vowels and applied time-domain and frequency-domain techniques to characterize their formant frequencies, bandwidths as well as fundamental frequencies along with the duration. We also applied different vowel normalization techniques for the classification and develop a Bangla vowel system that could be described in a triangular auditory space. The results provide data that can be used by researchers who require acoustic information about Bangla vowel production. It additionally presents the first large-scale analysis of Bangla vowels.

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GF (4) Based Synthesis of Quaternary Reversible/Quantum Logic Circuits

Mozammel H. A. Khan*, Marek A. Perkowski ******

Abstract

Galois field sum of products (GFSOP) has been found to be very promising for reversible/quantum implementation of multiple-valued logic. In this paper, we show nine quaternary Galois field expansions, using which quaternary Galois field decision diagrams (QGFDD) can be constructed. Flattening of the QGFDD generates quaternary GFSOP (QGFSOP). These QGFSOP can be implemented as cascade of quaternary 1-qudit gates and multi-qudit Feynman and Toffoli gates. We also show the realization of quaternary Feynman and Toffoli gates using liquid ion-trap realizable 1-qudit gates and 2-qudit Muthukrishnan-Stroud gates. Besides the quaternary functions, this approach can also be used for synthesis of encoded binary functions by grouping 2-bits together into quaternary value. For this purpose, we show binary-to-quaternary encoder and quaternary-to-binary decoder circuits using quaternary 1-qudit gates and 2-qudit Muthukrishnan-Stroud gates.

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Quantum Ternary Parallel Adder/Subtractor with Partially-Look-Ahead Carry

Mozammel H.A. Khan*, Marek A. Perkowski**

Abstract

Multiple-valued quantum circuits are a promising choice for future quantum computing technology since they have several advantages over binary quantum circuits. Binary parallel adder/subtractor is central to the ALU of a classical computer and its quantum counterpart is used in oracles – the most important part that is designed for quantum algorithms. Many NP-hard problems can be solved more efficiently in quantum using Grover algorithm and its modifications when an appropriate oracle is constructed. There is therefore a need to design standard logic blocks to be used in oracles – this is similar to designing standard building blocks for classical computers. In this paper, we propose quantum realization of a ternary full-adder using macro-level ternary Feynman and Toffoli gates built on the top of ion-trap realizable ternary 1-qutrit and Muthukrishnan–Stroud gates. Our realization has several advantages over the previously reported realization. Based on this realization of ternary full-adder we propose realization of a ternary parallel adder with partially-look-ahead carry. We also show the method of using the same circuit as a ternary parallel adder/subtractor.

Keywords: Arithmetic circuit; Logic synthesis; Quantum circuit; Ternary logic

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Reversible Realization of Quaternary Decoder, Multiplexer, and Demultiplexer Circuits

Mozammel H. A. Khan*

Abstract

A quaternary reversible circuit is more compact than the corresponding binary reversible circuit in terms of number of input/output lines required. Decoder, multiplexer, and demultiplexer are very important building blocks of digital systems. In this paper, we show reversible realization of these circuits using quaternary shift gates (QSG), quaternary controlled shift gates (QCSG), and quaternary Toffoli gates (QTG). We also show the realization of multi-digit QCSG and QTG using QSGs and QCSG.

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A Completely Portable Wireless Solution for Internet Service (Bangladesh Perspective)

Kazi Md. Abdullah Al Mamun**,** Arifur Rahman**,** A S M Enamul Hassan**,** Al-Amin Pervez**, Sabiha Rahman Juthy**, M.R. Amin**

Abstract

This paper is an organgram, necessity and orientation of a new system or just a vehicle, which is a completely portable ISP, includes a mobile VSAT for being self sufficient on Satellite Link and containing support of latest WiMAX Technology IEEE 802.16. Information and communication system over Internet can play a vital role in Bangladesh, in case of advancement, when Internet has became almost essential in developed countries then developing countries like Bangladesh are struggling with the barriers behind the Internet facilities. Internet came late in Bangladesh but in last few years it has grown radically, apparently in from of a very low base and low quality. Whereas People are interested for wireless connections of Internet with high quality, the solution of this paper is Portable Wireless Solution and it consists of different parts coming together in a vehicle or a package. The package will contain a mobile VSAT, Portable ISP, and WiMAX. Customers will be benefited from basic Internet services like e-mail, web browsing, web hosting, VoIP, etc from the Portable Wireless Solution. To introduce such an innovative solution to the people of Bangladesh this paper will be a road map for establishing a portable ISP with WiMAX support and an intelligent mobile VSAT in self oriented Satellite link. We will put the ISP in mid of the module which is portable including power source, satellite link, and there would have a mobile WiMAX technology like mobile BTS. This project is to implement a system just by using existing market equipment such a way that all the services relating Internet will be modernized, automated and completely portable.

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Modular and Standard Filters of a Directed Above Meet Semilattice

M. A. Hossain*****, A. S. A. Noor******

Abstract

A meet semilattice S is called *directed above* if for each a, b $\in$ S there exist d $\in$S such that d $\geq$ a, d $\geq$ b. In this paper we have introduced the notion of modular and dual standard elements in a directed above meet semilattice and included several characterizations of these elements. We prove that an element is dual standard if and only if it is both modular and dual distributive. We have also included a number of characterizations of modular and standard filters of directed above meet semilattices.

Key words: Directed above semilattice, Modular element, Dual distributive element, Dual standard element.

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Isomorphism Theorem for Standard Ideals of a Join Semilattice Directed Below

A.S.A. Noor*, M.R. Talukder**

Abstract

In this paper, the authors have studied some properties of standard and modular ideals of a join semilattice directed below. Also they have given the isomorphism theorem for standard ideals of a join semilattice directed below.

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Development of Deterministic Service Time Traffic Model for Packet Communication

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Abstract

Most of the traffic in telecommunication networks follows exponential arrival and exponential service time distribution like M/M/n/K. In wireless packet communications, the data streams are fragmented into different cells or packets and then sent over the air interface. For such a system, the service time of each cell or packet is fixed. Hence the deterministic service time traffic, like M/D/n/K, is applicable to detect traffic parameters in packet communication. In this paper, an effort has been made to give an overview of the traffic model M/D/n/K. Here the performance of the model is evaluated along with the probability state distribution. The authors have also designed a traffic model of single channel M/D/1 and M/D/1/K to evaluate network performance in their own way.

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Self-Consistent Modeling of Nano-Scale MOS Devices with High-K gate Dielectrics Considering Wave Function Penetration Effect

Anisul Haque*

Abstract

In this Chapter, we review our recent work on the self-consistent modeling of electrostatics for nano-scale MOS devices with high-K gate dielectrics. The physically based, self-consistent, quantum mechanical model incorporates the effect of wave function penetration into the gate dielectric through realistic open boundary conditions. Schrodinger's equation is solved using the logarithmic derivative technique for the retarded Green's function assuming that the electric filed is zero deep inside the gate metal as well as deep inside the silicon substrate. Poisson's equation is solved for the entire MOS structure to take into account the tails of the wave functions within the gate dielectric. The model is applied to calculate (i) the gate capacitance – voltage (C-V) characteristics, (ii) the direct tunneling gate current – voltage (J-V) characteristics, and (iii) the drain current in ballistic nano MOSFETs. Excellent agreement between experimental data and simulated results are obtained for both C-V and J-V characteristic curves. It is found that when wave function penetration is neglected, the degradation of the gate capacitance due to quantum mechanical effect is over-estimated. In the presence of wave function penetration, even for the same effective oxide thickness (EOT), gate capacitance of MOS devices with high-K gate dielectrics depends on the gate dielectric material. It is shown that the direct tunneling gate current is sensitive to the boundary conditions used for the solution of the Schrodinger's equation within the self-consistent loop. Neglect of the tunneling effect, associated with the open boundary condition, on the electrostatic potential leads to an under-estimation of the direct tunneling gate current. The effect of the wave function penetration on the drain current in ballistic MOSFETs depends on the orientation of the silicon substrate. In devices fabricated on (100) silicon, drain current and transconductance decrease when penetration effect is considered even though the gate capacitance increases in the presence of penetration. On the other hand, in devices on (111) silicon, penetration effect increases the drain current and transconductance.

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A Stochastic Approach for the Identification of Plant Promoter Containing TATA Box Using Support Vector Machine

Firoz Anwar*, Taskeed Jabid*, Syed Murtuza Baker*, Mohammad Shoyaib ******

Abstract

Promoter is a region of a DNA which regulates gene transcription. To understand how the organisms are developed from DNA sequence it is very much important to identify the promoter region. The promoter recognition process is a part of the complex process where genes interact with each other over time and actually regulates the whole working process of a cell. This paper attempts to develop an efficient algorithm that can successfully distinguish promoters and non promoters by first analyzing the existence of known residues and then the statistical data. The simplest way to identify promoters is to find the regulatory elements in different locations of a promoter with corresponding to the Transcription Start Site (TSS). In this paper, a TATA matrix is initially used to identify probable promoter regions within the given large DNA sequence. Then a method is proposed for discovering potential discriminating features from known dataset which eventually are used by the Support Vector Machine (SVM) i.e. is a stochastic machine to develop a model to identify a promoter from a non-promoter. A 7-fold cross-validation test shows an accuracy of 85.24% for this proposed method.

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Protein Secondary Structure Prediction with High Accuracy Using Support Vector Machine

Mohammad Shoyaib **, Syed Murtuza Baker**, Taskeed Jabid**, Firoz Anwar**
Haseena Khan***

Abstract
Mining Bioinformatics data is an emerging area of research. Proteomics is one of the largest areas of focus in bioinformatics and data mining research. Protein structure prediction is one of the most crucial and decisive problem in all the areas of research. Protein secondary structure can be used for the determination of the tertiary structure via the fold recognition method. Hence, predicting the secondary structures from the protein's primary sequences has attracted the attention of many researchers. Experimental methods have proved to be complex and expensive. So to develop a simple and accurate method for structure prediction is of great importance. In this paper, a new method has been proposed based on the machine learning technique. The first step of this proposal is to find out frequent patterns of consecutive amino acids in a protein database. After this, a set of frequent words (feature set) is found. Then Support Vector Machine (SVM) is used as a binary/tertiary classifier for the classification of protein secondary structure with these frequent words.

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Identification of Promoter Through Stochastic Approach

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Abstract

Analysis of a gene sequence, which is transcribed into RNA and then translated into protein, is a difficult task. If this could be achieved, it would make possible better understand how the organisms are developed from DNA information. The behavior of gene is highly influenced by promoter sequences residing upstream or downstream of the Transcription Start Site (TSS). The promoter recognition process is a part of the complex process where genes interact with each other over time and actually regulates the whole working process of a cell. This paper attempts to develop an efficient algorithm that can successfully distinguish promoters and non promoters by analyzing statistical data. A learning model is developed from the known dataset to predict the unknown ones.

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Risk Factors for Development of Sclerema in Infants with Diarrhoeal Disease

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Abstract

Background: Sclerema is a life threatening condition characterizes by diffuse, doughy feeling of the skin and/or rapidly spreading, tallow-like hardening of the subcutaneous tissue. It usually affects newborns with case-fatality ranging from 50-100%. Death usually occurs within hours to days of onset. There is lack of information on the pathogenesis and risk factors for development of sclerema.

Methodology: In this age and sex matched case-control study, we enrolled 30 infants with clinical sepsis and sclerema (cases) and another 60 age and sex matched infants with clinical sepsis but without sclerema (controls) from amongst those attending the Dhaka Hospital of ICDDR,B with diarrhea during May 2005 through April 2006.

Results: The median age of the subjects were 2.1 months. Case-fatality was significantly higher among the cases than the controls (30% vs. 2%, $p<0.001$), and they more frequently presented with sever dehydration (33% vs. 10%, $p=0.02$), hypoxia (56% vs. 18%, $p=0.008$), abdominal distension (50% vs. 22%, $p=0.01$), septic shock (20% vs. 2%, $p=0.005$), hypoglycemia (37% vs. 7%, $p<0.001$) and higher serum CRP (mg/dl) concentration (5.0 ± 4.6 vs. 2.2 ± 2.4; $p<0.001$). After adjusting for confounders, infants with sclerema were more likely to be hypothermic (OR 11.6, 95% CI 1.1-126.5, $p=0.04$), and have lower serum total protein (OR 1.12, 95% CI 1.04-1.21, $p=0.003$) and pre-albumin (OR 1.5, 95% CI 1.1-2.3, $p=0.03$).

Conclusion: Sclerema is associated with high case-fatality, and infants presenting with hypothermia, lower serum protein and pre-albumin along with clinical sepsis are at risk of developing sclerema.

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Modeling Effects of Interface Trap States on the Gate C-V Characteristics of MOS Devices with Ultrathin High-K Gate Dielectrics

Md. M. Satter*****, **Anisul Haque****

Abstract

A physically based, quantum mechanical model is presented for C-V characteristics of MOS devices with ultrathin high-K gate dielectrics including interface trap and wave function penetration effects. Numerical results show that C-V curves are rather sensitive to the details of the interface trap distributions. The proposed model may be used for accurately extracting profiles of interface trap states from low frequency C-V measurement.

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Influence of Wave Function Penetration on Short Channel Effects in Nanoscale Double Gate MOSFETs

A. I. Khan*, M. K. Ashraf **, **Anisul Haque***

Abstract

Influence of wave function penetration on short channel effects (SCEs) in nanoscale double gate (DG) MOSFETs are examined. Wave function penetration effects result in degradation of off-state current and reduction of threshold voltage in DG MOSFETs. Effects of wave function penetration on subthreshold swing and drain induced barrier lowering are insignificant.

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Necessity of Paradigm Shift in the Teaching of Engineering in Bangladesh

Anisul Haque*, M. I. Raza*

Abstract

In this article, we examine the teaching practices in the engineering educational programs of Bangladesh with respect to global accreditation requirements. Proposals are made to change pedagogical approaches so that the engineering graduates are equipped with skills which are not emphasized in our education but are considered important by international accreditation boards. It is argued that the Board of Accreditation for Engineering and Technical Education (BAETE) can play a leading role in introducing more modern pedagogical approaches in undergraduate engineering programs in Bangladesh.

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A Probabilistic Speech Enhancement Filter Utilizing the Constructive and Destructive Interference of Noise

T. Hasan*, **M. K. Hasan***

Abstract

A new probabilistic speech enhancement filter is presented in this paper considering the three state possibilities of discrete cosine transform (DCT) coefficients of noisy speech: speech absence, speech and noise are constructive, and destructive. The conditional probabilities of the three events are calculated using Gaussian approximations. Unlike conventional fixed values, the speech presence or absence probability in different spectral coefficients is experimentally calculated. A novel set of gain functions is proposed for accommodation of the aforesaid three possibilities, and merged into one, called the expected gain. It is used on the noisy speech component for enhancement. Experimental results are presented to show the effectiveness of the proposed denoising filter.

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Performance Comparison of the Frequency-Domain Multichannel Normalized and Variable step-size LMS Algorithms

M. A. Haque*, **M. K. Hasan***

Abstract

The paper provides a comparative performance analysis of the normalized multichannel frequency-domain least-mean-squares (MCFLMS) and variable step size MCFLMS (VSS-MCFLMS) algorithms used in blind channel identification. Both the algorithms eliminate the need of a priori estimation of the step size parameter for rapid convergence to the desired solution. We perform the convergence analysis of the normalized MCFLMS (NMCFLMS) and show that even for a moderate SNR, the algorithm fails to converge to the eigenvector corresponding to the minimum eigenvalue of the data correlation matrix and hence misconverge to a fictitious solution. On the other hand, we show that the VSS-MCFLMS algorithm converges, both in noise-free and noisy conditions to the eigenvector corresponding to the minimum eigenvalue and therefore more noise robust as compared to the NMCFLMS. The enhanced noise robustness of the VSS-MCFLMS algorithm over the NMCFLMS algorithm was verified.

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Pitch Estimation of Noisy Speech Signals Using Empirical Mode Decomposition

M. K. I. Mollah*, K. Hirose*, N. Minematsu**, **M. K. Hasan*****

Abstract

This paper presents a pitch estimation method of noisy speech signal using empirical mode decomposition (EMD). The normalized autocorrelation function (NACF) of the noisy speech signal is decomposed into a finite set of band-limited signals termed as intrinsic mode functions (IMFs) using EMD. One IMF component has the periodicity equal to the accurate pitch period. A conventional autocorrelation based pitch period detection method is used to select the IMF with pitch period. The accurate pitch period is obtained from the selected IMF. The pitch estimation performance in term of gross pitch error (GPE) of the proposed algorithm is compared with recently proposed methods. The experimental results show that the EMD based algorithm performs better in pitch estimation of noisy speech.

Index Terms: empirical mode decomposition, pitch estimation, normalized autocorrelation

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Speech Enhancement Using Soft Thresholding with DCT-EMD Based Hybrid Algorithm

E. Deger*, M. K. I. Mollah*, K. Hirose*, N. Minematsu**, **M. K. Hasan***

Abstract

This paper introduces a new speech enhancement method using soft thresholding with a Discrete Cosine Transform (DCT) and Empirical Mode Decomposition (EMD) based hybrid algorithm. Soft thresholding for DCT-enhancement is a powerful method for enhancing the noisy speech signal in a wide range of signal-to-noise ratios (S_Rs). However, due to the thresholding criteria a significant amount of noise is left in the enhanced signal. EMD is applied here to remove the remaining noise components. Due to the frequency characteristics of the intrinsic mode functions (IMFs), the noise components are mainly centered in the lower order IMFs. Therefore, it is possible to successfully identify and remove the remaining noise. The experimental results show that the proposed hybrid method is significantly more effective in removing the noise components from the noisy speech signal; thus giving better results in output S_R and quality compared to recently reported techniques.

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Further Enhancement of Speech Quality by Extracting Signal from Residual

T. Hasan*****, M. Huq***, M. K. Hasan***

Abstract

A two stage speech enhancement technique is presented in this paper. We show that overall denoising efficiency can be further improved by incorporating a residual processing technique with a conventional speech denoising method. The reminiscent speech components extracted from the residual using a harmonic model in the voiced frames and a simple yet effective time-domain thresholding technique in the unvoiced frames are added to the first stage denoising filter output for further enhancement. The experimental results demonstrate significant improvement in speech quality indices over the single stage speech enhancement methods for a wide range of signal-to-noise ratios (SNRs).

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EMD Based Soft Thresholding for Speech Enhancement

E. Deger*, M. K. I. Mollah*, K. Hirose*, N. Minematsu**, **M. K. Hasan***

Abstract

This paper introduces a novel speech enhancement method based on Empirical Mode Decomposition (EMD) and soft-thresholding algorithms. A modified soft thresholding strategy is adapted to the intrinsic mode functions (IMF) of the noisy speech. Due to the characteristics of EMD, each obtained IMF of the noisy signal will have different noise and speech energy distribution, thus will have a different noise variance. Based on this specific noise variance, by applying the proposed thresholding algorithm to each IMF separately, it is possible to effectively extract the existing noise components. The experimental results suggest that the proposed method is significantly more effective in removing the noise components from the noisy speech signal compared to recently reported techniques. The significantly better SNR improvement and the speech quality prove the superiority of the proposed algorithm.

Index Terms: speech enhancement, empirical mode, decomposition, soft-thresholding

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Acoustic Classification on Bangla Vowels

Syed Akhter Hossain*, M. Lutfar Rahman **, Farruk Ahmed***

Abstract

Bangla Vowel characterization determines the spectral properties of Bangla vowels for efficient synthesis as well as recognition of Bangla vowels. In this paper, Bangla vowels in isolated word have been analyzed based on speech production model within the framework of Analysis-by-Synthesis. This has led to the extraction of spectral parameters for the production model in order to produce different Bangla vowel sounds. The real and synthetic spectra are compared and a weighted square error has been computed along with the error in the formant bandwidths for efficient representation of Bangla vowels. The extracted features produced good representation of targeted Bangla vowel. Such a representation also plays essential role in low bit rate speech coding and vocoders.

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Algorithms for Synthesis and Average Distribution of Variable Sized MOS Components for Efficient Analog VLSI Devices

Mahmudul Faisal Al Ameen *, Md. Didar Islam **, **Syed Akhter Hossain*****

Abstract

In the field of Analog VLSI layout design, large variation of MOS component sizes causes mismatches and reduces the performance and splitting is necessary to reduce the variation. On the other hand, intensity of imposing always varies during fabrication. In this ongoing research, the solutions of above problems are introduced with some algorithm implementations. Two different sizes of components can be split into optimized number of pieces and an algorithm distributes them in an average and symmetrical (better) arrangement such that it can ensure average imposing and the efficiency increases. The computer generated solutions are compared with other possible solutions and proved better.

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Bangla Vowel Characterization Based on Analysis by Synthesis

Syed Akhter Hossain*, M. Lutfar Rahman **, Farruk Ahmed***

Abstract

Bangla Vowel characterization determines the spectral properties of Bangla vowels for efficient synthesis as well as recognition of Bangla vowels. In this paper, Bangla vowels in isolated word have been analyzed based on speech production model within the framework of Analysis-by-Synthesis. This has led to the extraction of spectral parameters for the production model in order to produce different Bangla vowel sounds. The real and synthetic spectra are compared and a weighted square error has been computed along with the error in the formant bandwidths for efficient representation of Bangla vowels. The extracted features produced good representation of targeted Bangla vowel. Such a representation also plays essential role in low bit rate speech coding and vocoders.

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Determination of Bow-Tie & Slot Antenna Parameters Using RWG Edge Elements

Md. Asif Hossain ***,** S.H. Shah Newaz***,** Md. Imdadul Islam****,**　**M.R. Amin***

Abstract

If any electric filed incidents on any antenna, voltage is induced on the surface of it. This induced voltage creates surface current on the antenna, which is actually the received signal. To analyze such a surface current we divide the surface of the antenna into some small triangles. These triangles are formed and arranged as alternate (positive & negative) charged surfaces. Two adjacent opposite charged triangles are known as Rao-Wilton-Glisson (RWG) edge element. We can calculate impedance matrix and surface current density by using this RWG edge element. In this work, we have used bow-Tie and slot antenna for the evaluation of the antenna parameters mentioned above.

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GF (4) Based Synthesis of Quaternary Reversible/Quantum Logic Circuits

Mozammel H. A. Khan*, Marek A. Perkowski **

Abstract

Galois field sum of products (GFSOP) has been found to be very promising for reversible/quantum implementation of multiple-valued logic. In this paper, we show nine quaternary Galois field expansions, using which quaternary Galois field decision diagrams (QGFDD) can be constructed. Flattening of the QGFDD generates quaternary GFSOP (QGFSOP). These QGFSOP can be implemented as cascade of quaternary 1-qudit gates and multi-qudit Feynman and Toffoli gates. We also show the realization of quaternary Feynman and Toffoli gates using liquid ion-trap realizable 1-qudit gates and 2-qudit Muthukrishnan-Stroud gates. Besides the quaternary functions, this approach can also be used for synthesis of encoded binary functions by grouping 2-bits together into quaternary value. For this purpose, we show binary-to-quaternary encoder and quaternary-to-binary decoder circuits using quaternary 1-qudit gates and 2-qudit Muthukrishnan-Stroud gates.

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Quantum Realization of Some Ternary Circuits Using Muthukrishnan-Stroud Gates

Asif I. Khan*, Nadia Nusrat**, Samira M. Khan**, Masud Hasan**, **Mozammel H.A. Khan*****

Abstract

We present realization of ternary Toffoli gate and modified Fredkin gate for quantum computing on top of ion trap realizable Muthukrishnan-Stroud primitive gates. Our design methodology is based on first realizing the quantum circuits using generalized ternary gates and Feynman gates and then replacing them with their equivalent realization using Muthukrishnan-Stroud gates. Our realization of ternary Toffoli gate is more efficient than the previously published result and modified Fredkin gate is realized for the first time in literature using Muthukrishnan-Stroud gates.

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Synthesis of Incompletely Specified Multi-Output Quaternary Function Using Quaternary Quantum Gates

Mozammel H. A. Khan*

Abstract

Multiple-valued quantum circuits are a promising choice for future quantum computing technology since they have several advantages over binary quantum circuits. In this paper, we propose quaternary multi-qudit controlled gate family and show their realization on the top of liquid ion-trap realizable 1-qudit gates and 2-qudit Muthukrishnan-Stroud gates. Then we show a method of synthesizing incompletely specified multi-output quaternary function using quaternary 1-qudit gates and multi-qudit controlled gates.

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Adaptive Beamforming of Linear Array Antenna System with Provision of Sidelobe Cancellation

M. R. A. Khandaker*****, Imdadul Islam****, M.R. Amin***

Abstract

In case of single element antennas like Yagi-Uda, spiral, dipole, horn etc. have very little capability of variation antenna gain pattern. For better directivity, electronic tracking and reshaping of beam, array antenna is widely used in wireless network. Relative magnitude of feed currents, relative phases/separation between antenna elements, geometry of array are responsible for the shape of radiation pattern. In this paper linear array antenna with adaptive algorithm is used to achieve desired gain pattern at a desired angle of arrival (AOA). Linearly constraint minimum variance (LCMV) algorithm can be used quite comfortably for a desired gain incorporating Lagrange multiplier but side lobes can not be cancelled properly. This paper deals with combination of LCMV, sidelobe cancellation, LMS algorithm to achieve derided antenna gain pattern keeping sidelobe below a threshold level.

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Intelligence Adaptation in Visitor Location Register to Enhance the Performance of Next Generation Cellular Network

S.H. Shah Newaz**,** Md. Asif Hossain ***, Kazi Khaled Al Zahid*, M.R.Amin***

Abstract

The number of mobile phone users is increasing exponentially. So, in the near future, anticipated large number of mobile phone users may introduce very large centralized database and may increase the signaling load to transmit the information of mobile users between Home Location Register (HLR) to Visitor Location Register (VLR). This paper proposes a method by which we can enrich the network performance and with the potential of reducing the overall signaling and channel load in the Global System for Mobile Communications (GSM). This paper proposes different strategy for VLR where it will be able to take decision whether the information of mobile user who is currently entering to another adjacent Mobile Service and Switching Center (MSC) area, will be saved inside the database or be dropped.

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Generalized Stone Nearlattices

A. S. A. Noor *, A.K.M.Sirajul Islam**

Abstract

Here the authors introduce the notions of generalized Stone and quasi-complemented nearlattices. They show that a distributive nearlattice S with 0 is quasi-complemented if and only if it is sectionally quasi-complemented and posseses an element d such that (d]*= (0]. They also show that a nearlattice is generalized Stone if and only if it is normal and sectionally quasi-complemented.

Key Words: Near lattice, Normal Near lattice, Generalized Stone Near lattice, Quasi-Complemented Near lattice

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A Ternary Operation in a Lattice

Jahanara Begum *, A.S.A. Noor**

Abstract

Kolibiar [4] showed that for a neutral element n of a lattice L, $L_n = (L; \cap)$ is a semi lattice, where $x \cap y = m(x, n, y) = (x \wedge y) \vee (x \wedge n) \vee (y \wedge n)$, while Noor [5] showed that L_n is in fact, a near lattice. A near lattice is a meet semilattice with the property that any two elements possessing a common upper bound, have a supremum. In this paper, we improve their results. We show that L_n is a near lattice if n is merely a nearly neutral element by using a ternary operation $J_n(x, y, z)$. Moreover, the ideals of L_n are the n-ideals of L and both L and L_n share the same congruences when n is neutral. An n-ideal of a lattice L is a convex sublattice of L containing the element $n \in L$. This is a kind of generalization of ideals and filters in a lattice. At the end we include a characterization of neutral elements.

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Finitely Generated n-Ideals which Form Relatively m-Normal Lattices

Md. Abul Kalam Azad*, **A. S. A. Noor****

Abstract

A convex sublattice of a lattice L containing an element $n \in L$ is called an n-ideal. The set of all finitely generated n-ideals is denoted by $F_n(L)$, which is a lattice. A distributive lattice with 0 is called an m-normal lattice if its every prime ideal contains at most m number of minimal prime ideals. A distributive lattice with 0 is called a relatively m-normal lattice if the interval [0,x] is m-normal for each $x \in L$. In this paper we include some characterizations of those $F_n(L)$ which form relatively m-normal lattices. We show that $F_n(L)$ is relatively m-normal if and only if for any m+1 pair wise incomparable prime n-ideals $P_0, P_1, \ldots\ldots\ldots, P_m$; $P_0 \vee P_1 \vee \ldots\ldots\ldots \vee P_m = L$.

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Radiation Imaging Operators for Acoustic Boundary Detection

Md. Ishfaqur Raza*, Richard E. DuBroff**

Abstract

This paper describes an imaging operator for the acoustic case based upon a combination of one way wave equations (radiation boundary conditions) with material boundary conditions describing the continuity of variables associated with the acoustic wave propagation. The particular type of problem for which these operators were developed consists of an unknown boundary between two acoustic materials, each having well known properties, with observations made on some datum surface in medium 1 due to a known incident wave generated in medium 1. Properties and parametric dependence of the imaging operators will be described and a few simple two dimensional examples will be presented to show the raw data and the resulting images. Some extensions to higher order radiation imaging operators as well as operators for the electromagnetic wave imaging case will be described.

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Joint Collaboration for the Growth of Engineering Education in Bangladesh

Md. Ishfaqur Raza*

Abstract

Education systems in developing countries need to be revamped to meet the challenges of the 21st century. A mechanical approach to education can no longer serve the interest of the nation nor the graduates it produces. The education methodologies must be improved to effectively deliver education. The role of the industry and the government is also very critical. The industry must work with the educational institutions to produce quality professionals that they desire while the government must formulate policies to ensure the short and long term industrial growth founded on a robust education system. Due to the limited resources of the government, private philanthropy along with industry contribution is mandatory to shape an education system that will deliver qualified and skilled professionals. University and Industry joint collaboration in the form of infrastructure support, scholarships, and funding will go a long way in promoting the quality of education in Bangladesh.

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