Abstract of Published Papers

Tanbir Ahmed Chowdhury S S M Sadrul Huda Kazi Khaled Shams Chisty A.K.Enamul Haque Arifa Rahman Mozammel H A. Khan Mohammad Zakir Hossain Sarker Syed Akhter Hossain KaziKhaled Al-ZahidSyed Murtuza Baker Chowdhury GolamHossaiAnisul Haque Bidyut Kanti DattaSufia Islam M.R. Amin M. S. Alam S. Jahan Mustafa Hussain Tanbir Ahmed Chowdhury S S M Sadrul Huda Kazi Khaled Shams Chisty A.K.Enamul Haque Arifa Rahman Mozammel H A. Khan Mohammad Zakir Hossain Sarker Syed Akhter HossainKaziKhaled Al-ZahidSyed Murtuza Baker Chowdhury GolamHossaiAnisul Haque Bidyut Kanti DattaSufia Islam M.R.Amin M. S. Alam S. Jahan Mustafa Hussain Tanbir Ahmed Chowdhury S S M Sadrul Huda Kazi Khaled Shams ChistyA.K.Enamul Haque Arifa Rahman Mozammel H A. Khan Mohammad Zakir Hossain Sarker Syed Akhter HossainKaziKhaled Al-ZahidSyed Murtuza Baker Chowdhury GolamHossaiAnisul Haque Bidyut Kanti DattaSufia Islam M.R.Amin M. S. Alam S. Jahan Mustafa Hussain Tanbir Ahmed Chowdhury S S M Sadrul Huda Kazi Khaled Shams ChistyA.K.Enamul Haque Arifa Rahman Mozammel H A. Khan Mohammad Zakir Hossain Sarker Syed Akhter HossainKaziKhaled Al-ZahidSyed Murtuza Baker Chowdhury GolamHossaiAnisul Haque Bidyut Kanti DattaSufia Islam M.R.Amin M. S. Alam S. Jahan Mustafa Hussain Tanbir Ahmed Chowdhury S S M Sadrul Huda Kazi Khaled Shams ChistyA.K.Enamul Haque Arifa Rahman Mozammel H A. Khan Mohammad Zakir Hossain Sarker Syed Akhter Hossain KaziKhaled Al-ZahidSyed Murtuza Baker Chowdhury GolamHossaiAnisul Haque Bidyut Kanti DattaSufia Islam M.R.Amin M. S. Alam S. Jahan Mustafa Hussain Tanbir Ahmed Chowdhury S S M Sadrul Huda Kazi Khaled Shams ChistyA.K.Enamul Haque Arifa Rahman Mozammel H A. Khan Mohammad Zakir Hossain Sarker Syed Akhter HossainKaziKhaled Al-ZahidSyed Murtuza Baker Chowdhury GolamHossaiAnisul Haque Bidyut Kanti DattaSufia Islam M.R. Amin M. S. Alam S. Jahan Mustafa Hussain Tanbir Ahmed Chowdhury S S M Sadrul Huda Kazi Khaled Shams ChistyA.K.Enamul Haque Arifa Rahman Mozammel H A. Khan Mohammad Zakir Hossain Sarker Syed Akhter HossainKaziKhaled Al-ZahidSyed Murtuza Baker Chowdhury GolamHossaiAnisul Haque Bidyut Kanti DattaSufia Islam M.R.Amin M. S. Alam S. Jahan Mustafa Hussain Tanbir Ahmed Chowdhury S S M Sadrul Huda Kazi Khaled Shams ChistyA.K.Enamul Haque Arifa Rahman Mozammel H A. Khan Mohammad Zakir Hossain Sarker Syed Akhter HossainKaziKhaled Al-ZahidSyed Murtuza Baker Chowdhury GolamHossaiAnisul Haque Bidyut Kanti DattaSufia Islam M.R.Amin M. S. Alam S. Jahan Mustafa Hussain Tanbir Ahmed Chowdhury S S M Sadrul Huda Kazi Khaled Shams ChistyA.K.Enamul Haque Arifa Rahman Mozammel H A. Khan Mohammad Zakir Hossain Sarker Syed Akhter HossainKaziKhaled Al-ZahidSyed Murtuza Baker Chowdhury GolamHossaiAnisul Haque Bidyut Kanti DattaSufia Islam M.R.Amin M. S. Alam S. Jahan Mustafa Hussain Tanbir Ahmed Chowdhury S S M Sadrul Huda Kazi Khaled Shams Chisty A.K.Enamul Haque Arifa Rahman Mozammel H A. Khan Mohammad Zakir Hossain Sarker Syed Akhter HossainKaziKhaled Al-ZahidSyed Murtuza Baker Chowdhury GolamHossaiAnisul Haque Bidyut Kanti DattaSufia Islam M.R. Amin

East West University
CENTER FOR RESEARCH AND TRAINING
2006

Preface

It is my pleasure to introduce to you this volume which contains abstract of papers published in 2006 in which EWU faculty members were one of the authors. I am pleased to inform you that in 2006, EWU faculty members contributed in 39 research articles. Of them, 6 from the Faculty of Business and Economics, 1 from the Faculty of Liberal Arts and Social Sciences, and 30 from the Faculty of Sciences and Engineering. Let me take this opportunity to congratulate the member of the Faculty of Sciences and Engineering for their grand success.

In terms classification of the articles, 18 articles were published in refereed journals, of them 4 were authored by teachers of the Faculty of Business and Economics, and 14 were authored by the teachers of the Faculty of Sciences and Engineering in 2006. Of these 18 articles, only 4 were in journals published from Bangladesh and the rests were in international journals published from Sweden, India, USA, and many other countries. On the other hand, in 2006 our faculty members attended 18 national and international conferences where they presented papers individually or jointly. Two citations are from books where our faculty members have contributed.

It is due to all these, EWU decided to publish this annual abstract series. Farha Naz, Secretary of the EWU Center for Research and Training worked hard to bring this volume to this level. I sincerely appreciate her effort to make this publication a success. Since this is our first volume, we had to work from the scratch and there has been some delay in publishing this volume. I apologise to you for this delay.

Finally, the volume also contains an index of EWU authors which you can find in the last page. Have a look at it, you will get a surprise! In the Faculty of Business and Economics Dr Tanbir Ahmed Chowdhury and Dr. A.K. Enamul Haque, and in the Faculty of Sciences and Engineering Dr. Anisul Haque, Dr Mozammel Huq Azad Khan, Mohammad Zakir Hossain Sarker, Dr. M. Ruhul Amin, and Syed Akhter Hossain had more than one publications to their credit in 2006. Congratulation folks!

Dhaka   **Dr. A.K. Enamul Haque**
June 29, 2007   Executive Director, EWUCRT

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BUSINESS AND ECONOMICS

Adoption of Arsenic-Safe Drinking Water Practice in Rural Bangladesh: An Averting Behavior Model

A.K. Enamul Haque*, Sonia Aftab**, M.Zakir Hossain Khan***

Abstract

The aim of this paper is to analyze the factors that influence adoption of safe drinking water practices in arsenic affected rural Bangladesh. In this study, households from two severely arsenic contaminated areas of Bangladesh were asked about their behavior and actions to reduce potential health risk associated with drinking the contaminated water. Based on averting measures undertaken by households to reduce potential health risk, the paper analyzes the factors that influence households' decision to collect water from arsenic free sources using a binary logistic model. Among all explanatory factors included in the model, awareness of health consequences from drinking arsenic contaminated and ownership characteristics of safe drinking water sources had the highest explanatory power. Households that are aware of negative health consequences of drinking water arsenic contaminated water are more likely to adopt safe drinking water practices. Furthermore, places where safe drinking water option is owned by Government (GO) and/or Non-Government (NGO) organizations, households are more likely to collect water from arsenic free sources compared to places where available safe drinking water options are privately owned. The relevance of the explanatory variables in the estimated model suggests that effectiveness of 'arsenic safe drinking water adoption campaign' requires raising awareness about health risk associated with drinking arsenic contaminated water. As access to print more media(like newspaper) is constrained by high level of illiteracy in the rural areas, radio, and TV must play a more important role in publicizing negative health consequences of drinking arsenic-contaminated water.

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An Appraisal of the Activities of Investment Corporation of Bangladesh

Tanbir Ahmed Chowdhury*

Abstract

The main function of a capital market along with other financial and non-financial
institutions is to assist in the allocation of a nation's limited capital resources among
numerous competing alternative uses. To meet the investors of all types, a wide range and
adequate number of securities should be made in the capital markets. Institution and
institutional supports are necessary for such capital market activity. Investment Corporation
of Bangladesh (ICB) the national investment house is the lone organization to perform the
activities of creating demand for securities and on the other hand to ensure the supply of
securities in Bangladesh capital markets. In recent years with the changing economic climate,
the Government of Bangladesh has emphasized the development of ICB. Government is also
trying to develop the ICB through different policy measures, even though the rate of
development is not up to expectation. Thus, the situation warrants detailed examination of the
activities of ICB. The present study is an attempt to evaluate the performance of ICB with
special emphasize on ICB mutual funds, ICB unit fund, ICB investors' scheme, its
contribution as one of the institutional investors for the development of stock markets and
financial performance of ICB. For evaluating the performance of ICB data has been analyzed
through the various statistical measures like growth percentage, average growth, trend
equations, and square of correlation coefficient, and correlation matrix.

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The Role of Agency and Bankruptcy Costs for the Determination of Capital Structure: A Survey of Theory and Evidence

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

Abstract

A crucial question facing companies in need of new finance is whether to raise debt or to raise equity. In spite of various developments in finance theory the determination of capital structure has been a subject of theoretical debate since the publication of Modigliani-Miller's (1958) article developed within the framework of perfect capital market. Moreover, the determination of the optimal debt ratio in the firms capital structure is one of the most discussed and central issues both in finance literature and empirical research. Over the years, numerous theories have been put forward to address the issues, and empirical studies have also been conducted on different financial environment. This paper sheds light on the theoretical and empirical issues of agency and bankruptcy theories for capital structure decision. It reveals that the determination of debt ratio is an elusive and difficult quantity to measure, and its estimation is still a matter of controversy. Moreover, there is as yet no fully satisfactory theoretical model for predicting the optimal debt equity ratio in the firm's capital structure. Empirical studies provide diverse determinants of capital structure based on different models of agency and bankruptcy costs.

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An Overview of Robert Stake, Robert K. Yin, Norman K. Denzin and Nigel Fielding's Contributions to Social Research

Jashim Uddin Ahmed* , S S M Sadrul Huda**

Abstract

The aim of this paper is twofold: on one hand, it discusses the key authors' profile and contributions to "social research". On the other hand, it speculates the possibility of updating the notion of social research in our time. This paper introduces the works of key social research authors (such as Robert Stake, Robert K. Yin, Norman K. Denzin and Nigel Fielding) in order to provide the readers with an in-depth understanding of the different aspects of qualitative and quantitative research. All these social researchers have had an important influence on development of qualitative and quantitative research from early twentieth century. This paper addresses a widespread review of social research gurus and their contributions.

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Providing Urban Services – The Challenge Ahead

A.K. Enamul Haque*

Abstract

Urban services include provision of services like (a) power (b) energy (c) water (d) sanitation (e) education (f) health (g) transportation (h) police and judiciary (i) services for the elderly population. It is possible to classify these services into three clusters. First the infrastructure services viz- power, energy, water, sanitation, and transportation services; second the social services- education, and health and third regulatory services-police and judicial services. Providing these services is a necessity in any urban city and handling them efficiently is a major challenge. Unfortunately, many city dwellers take these services for granted and never consider failure as an answer. This is partly because of the pattern of livelihood that urban dwellers are used to.

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5th International Conference on Creating Competitive Advantage in Global Economy
PCTE-Ludhiana, India, April 8, 2006

Effects of Global Competition in Telecommunication Administration in Bangladesh

Kazi Munir Uddin*, **Kazi Khaled Shams Chisty****

Abstract

Teledensity of Bangladesh is still the lowest in South Asia. The Bangladeshi telecommunication industry has been now facing global competition as different multinational telecommunication companies have been trying to penetrating into this market. Hence, the existing phone companies have been loosing their competitiveness and market shares. To retain market-share, existing local companies have been pursuing to fulfill the need gap of phone services in different region of Bangladesh.

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LIBERAL ARTS AND SOCIAL SCIENCES

Effect of BRAC-PACE Training on English Language Teachers of Rural Non-Government Secondary Schools

Arifa Rahman*, Md Mahbubul Kabir**, Rifat Afroze**

Abstract

This study investigated the effect of the BRAC-PACE residential training program of English language teachers in rural non-government secondary schools. I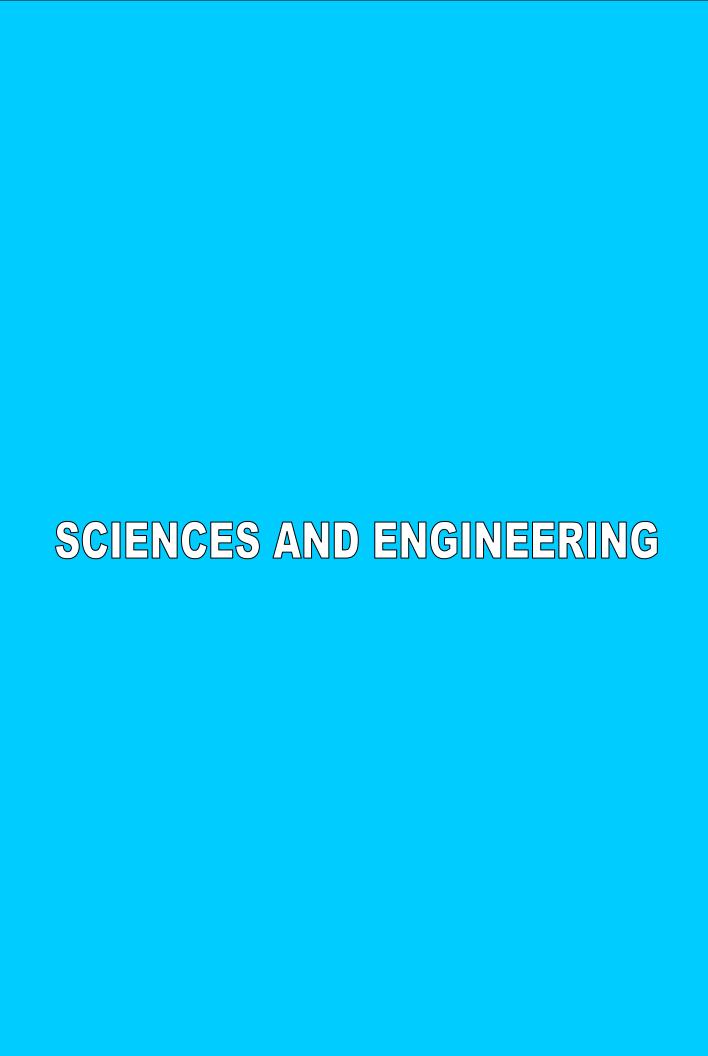ntroduced in 2001, its aim was to enhance capacity building of English teachers to help them cope with the demands of the revised curriculum at the secondary level. The study examined the change in the teachers in terms of their pedagogic skills, language skills development, knowledge about communicative language teaching (CLT) and their attitudes towards this new approach. The relevance of the training and the existing challenges were also investigated.

The study findings pointed to a mixed picture. Positive signs were apparent in a general improvement on some particular issues but there were variations across districts and across age, gender, experience, and educational level of the groups. In spite of a general improvement in teachers' knowledge about CLT and the skills involved in its application in the classroom, there was little evidence of much difference in the existing classroom practices of trained and non-trained teachers. More importantly, students were not being affected in any significant manner. Although most teachers perceived the training program and the materials both relevant and useful for their professional development, they did not believe that CLT could be effectively applied in the rural school classroom settings,thus implying a set of ingrained beliefs, which appeared to influence teachers' attitudes and behavior in classroom.

In the discussion phase, a macro perspective was adopted in order to understand the apparent mismatch between the traditional mindset of English language teachers and the demands made by the communicative approach to teaching. As the findings pointed to the presence of a set of ingrained belief systems that influenced teacher behavior, it was argued that, in principle, an understanding of cognition (teachers' beliefs and perceptions), context (the local setting with its factors/constraints) and the prevalent educational culture (traditional teaching/learning styles) needed to be incorporated into the program. In particular, an interaction with trainee-teachers' perceptions and attitudes was suggested, as it was likely to enable them to engage with and make sense of the training process. In addition, the issue of re-casting ideas within one's own frame of reference in order to suit the local culture was emphasized. In the process, some manageable and attainable revisions/inclusions were discussed. Thus an overall principled approach to the training program was forwarded.

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SCIENCES AND ENGINEERING

Magnetosonic wave instability in a streaming dusty plasma

M Salimullah*, M I U Khan*, M K Islam*, **M.R. Amin**,** P K Shukla***

Abstract

General dispersion relation of plasma waves in a finite temperature flowing dusty plasma in the presence of an external magnetic field has been examined using the Vlasov- Maxwell system of equations. In the frequency regime between ion and dust cyclotron frequencies, the transverse electromagnetic dust-ion magnetosonic wave mode is found to propagate nearly perpendicular to the external magnetic field, which reduces to the usual magentosonic wave in the absence of dust. The electrostatic dust-lower-hybrid mode is also recovered propagating nearly perpendicular to the external magnetic field in a finite ion temperature and cold dust plasma, which for the strong ion-Larmor radius effect reduces to the usual dust-acoustic wave driven by the ion pressure.

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Dust-lower-hybrid instability in a streaming magnetized dusty plasma

M.R. Amin*, A M Rizwan**, M K Islam**, M Salimullah**, P K Shukla***

Abstract

Instabilities for the excitation of the dusty plasma modes, namely the dust-acoustic and dust-lower-hybrid waves, due to the free streaming of ion/dust particles in uniformly magnetized dusty plasmas have been examined analytically. Expressions for growth rates and threshold have been presented for different conditions of free streaming beams of either ions, dust grains, or two contrastreaming dust particle beams. The relevance of the present investigation has been pointed out for laboratory as well as space dusty plasmas

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Analgesic and anti-inflammatory activities of Sida cordifolia Linn

R K. Sutradhar*, A.K.M.M. Rahman*, M.U. Ahmad**, B.K. Datta***, S.C. Bachar****,
A. Saha ****

Abstract

The analgesic activity of a Bangladashi medicinal plant Sida cordifolia was evaluated by acetic acid induced writhing response method in Swiss albino mice. Carrageenan induced rat paw edema was used for testing the anti-inflammatory activity. Different extracts of S. cordifolia in doses 100 and 200 mg/kg were chosen for pharmacological assesment. In acetic acid induced writhing test, the extracts Chloroform (A), methanol (B), n-hexane (D), dichloromethane (E), ethyl acetate (F), basic extract (H) and neutral extract and (I) in doses 100 and 200 mg/kg showed (58.86, 66.53 %), (45.56,52.81%), (48.78, 55.64%), (26.20, 56.44%), (26.61, 52.43%), (43.55, 56.06%) and (41.13, 54.85%) writhing inhibition respectively. In carrageenan-induced rat paw edema the extracts (A), (B), (F), (G) and (H) exhibited 33.61, 32.97, 34.46, 39.35 and 40.85 % inhibition of paw edema respectively at the end of fourth hour. The present study indicates that the extracts of S. cordifolia has significant analgesic and anti-inflammatory activities

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Accumulation gate capacitance of MOS devices with ultra-thin high-K gate dielectrics: modeling and characterization

A. E. Islam*, **Anisul Haque****

Abstract

A quantum–mechanical (QM) model is presented for accumulation gate capacitance of MOS structures with high-κ gate dielectrics. The model incorporates effects due to penetration of wave functions of accumulation carriers into the gate dielectric. Excellent agreement is obtained between simulation and experimental C–V data. It is found that the slope of the C–V curves in weak and moderate accumulation as well as gate capacitance in strong accumulation varies from one dielectric material to another. Inclusion of penetration effect is essential to accurately describe this behavior. The physically based calculation shows that the relationship between the accumulation semiconductor capacitance and Si surface potential may be approximated by a linear function in moderate accumulation. Using this relationship, a simple technique to extract dielectric capacitance for high-κ gate dielectrics is proposed. The accuracy of the technique is verified by successfully applying the method to a number of different simulated and experimental C–V characteristics. The proposed technique is also compared with another method available in the literature. The improvements made in the proposed technique by properly incorporating QM and other physical effects are clearly demonstrated.

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Analysis of the line width enhancement factor (α-factor) in compressively strained InGaAsP quantum wire lasers

M. A. Khayer*, Anisul Haque**

Abstract

The linewidth enhancement factor (α-factor) of compressively strained (CS) InGaAsP/InP quantum wire (QWire) lasers is theoretically studied using an eight-band k·p formalism. It is found that tensile strained (TS) barriers lower the value of the α-factor by suppressing elastic strain relaxation. When multiple QWire layers are stacked vertically, the α-factor decreases owing to the increase in the modal gain. However, the decrease is lower than expected, because enhanced strain relaxation in multiple-layer stack tends to increase the α-factor. Comparison of the α-factors of QWires and QWells at the lasing frequency shows that the peak value of the α-factor decreases monotonically with increasing confinement, but an improvement in the α-factor of QWires at threshold condition relative to the α-factor of QWell lasers is not achieved unless the QWire width is reduced below a critical value. These results provide useful guidelines for designing CS QWire lasers with reduced values of the α-factor.

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Elastic strain relaxation in GaInAsP/InP membrane quantum wire lasers

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

Abstract

Strain distribution in GaInAsP/InP compressively strained membrane quantum wires (with low refractive index polymer cladding layers) fabricated by electron-beam lithography, reactive-ion etching and two-step epitaxial growth is theoretically calculated using finite element analysis. Results are compared with those of its conventional counterpart in which InP cladding layers are used. It is found that the etching away of the InP cladding layers in membrane structures causes a redistribution of elastic strain. The normal strain along the growth direction is the most affected component during this redistribution. We have also studied the effects of varying wire width, barrier tensile strain and other parameters on the strain relaxation. The effective bandgap in the presence of strain relaxation is also estimated. Results show that owing to the redistribution of strain, membrane structures exhibit an increase in the effective bandgap.

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Intestinal enzymes during malnutrition & infection in rabbits

Sufia Islam*, Amal K. Mitra**, Ashish K. Chowdhury***, Nur Haque Alam***

Abstract

Malnutrition plays an important role in the intestinal absorption of nutrients. However, reports are not consistent whether intestinal enzymes are decreased in the presence of malnutrition. It is also not clear whether simultaneous presence of malnutrition and infection adds to the problem of malabsorption of nutrients. The aim of the present study was to determine intestinal functions in terms of concentrations of disaccharidase enzymes during diarrhoea and protein energy malnutrition.

Concentrations of three disaccharidase enzymes, namely maltase, sucrase and lactase were measured in nine energy-restricted and five control rabbits during diarrhoea induced by rabbit diarrhoeagenic Escherichia coli (RDEC-1). Malnutrition was achieved in the rabbit model by feeding the animals for 30 days with half the amount of food fed to well-nourished control rabbits. Both the energy-restricted and the control groups were challenged by RDEC-1. Diarrhoea occurred on day 1-7 after administration of the strain. After onset of diarrhoea, both groups of rabbits were sacrificed and their intestinal mucosa was examined to determine the concentration of lactase, maltase and sucrase.

The energy-restricted animals and controls did not differ significantly for concentrations (units/mg proteins) of lactase (0.65 ± 0.28 vs 0.56 ± 0.17), maltase (6.20 ± 2.70 vs 6.47 ± 1.90) and sucrase (5.42 ± 2.30 vs 5.13 ± 1.40) measured during acute infectious diarrhoea.

The results suggested that the enzymatic functions of the intestinal brush border were not statistically different during diarrhoea among malnourished rabbits compared with their well-nourished counterparts.

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An ASIC Architecture for Generating Optimum Mixed Polarity Reed-Muller Expression

Mozammel H A. Khan*

Abstract

Logic function realization using Reed-Muller (RM) expression has manifold advantages over realization using SOP expression. In this paper, we present an ASIC architecture for generating optimum 3-variable mixed polarity RM expression. The ASIC based minimization is much faster than the software based minimization. The design is modeled using Verilog HDL and synthesized using Quartus II 4.2 software for Stratix EP1S10F484C5 FPGA device.

* Department of Computer Science and Engineering , East West University

Design of Reversible/Quantum Ternary Multiplexer and Demultiplexer

Mozammel H A Khan*

Abstract

In this paper, we show realization of macro-level ternary reversible 2-qudit Feynman gate, 3-qudit controlled Feynman gate, and 3-qudit Toffoli gates using ternary reversible 1-qudit gates and 2-qudit Muthukrishnan-Stroud gates, which are theoretically realizable using quantum technology such as liquid ion trap. Then we show the design of ternary reversible multiplexer and demultiplexer using the macro-level gates.

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On Universality of General Reversible Multiple-Valued Logic Gates

Pawel Kerntopf*, Marek A Perkowski**, **Mozammel H A Khan*****

Abstract

A set of p-valued logic gates (primitives) is called universal if an arbitrary p-valued logic function can be realized by a logic circuit built up from a finite number of gates belonging to this set. In the paper, we consider the problem of determining the number of universal single-gate libraries of p-valued reversible logic gates with two inputs and two outputs under the assumption that constant signals can be applied to arbitrary number of inputs. We have proved some properties of such gates and established that over 97% of ternary gates are universal.

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A New Approach to Spliced Alignment Gene Prediction Algorithm

Mohammad Zakir Hossain Sarker* , Jubair al Ansary**, Md. Shajjad Hossain Khan**,
Dewan Md. Rashed Iqbal**

Abstract

 Genomics is the field of study that seeks to understand the structure and function of all genes in an organism based on knowing the organism's entire Deoxyribonucleic Acid (DNA) sequence and extensive reliance on powerful computer technologies. The science of Bioinformatics, which is the bonding between molecular biology with computer science, needed genomic information to contribute in various disciplines. In recognition of that, many universities, government institutions and pharmaceutical firms have formed bioinformatics groups, consisting of molecular biologists and computer scientists. All of these bioinformatics groups are depended on laboratory experiments along with web base resources. These web recourses are time consuming and rigorous to access and use. This paper has studied some of the existing gene prediction algorithms, which are used behind these web-based resources. Gene prediction algorithm predicts the probability of existing genes in the biological sequences such as protein sequences or DNA sequences. This paper also describes a new approach to spliced alignment algorithm, one of the mostly used gene prediction algorithms. This new approach is more accurate and will overcome the complexities of the existing algorithm. And also will make the whole research procedure faster and easier.

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Parsing Algorithms for Bengali Parser to Handle Affirmative Sentences

Mohammad Zakir Hossain Sarkar*, Shaila Rahman**, M.A Mottalib***

Abstract

This paper embodies the design of parsing algorithms tangibly for a Bengali parser. To design parsing algorithms a detailed study on linguistics and grammar has been performed. A detailed study also has been made on the various techniques and algorithms of the parsers which have been designed for various languages such as English, Arabic, Hindi, Warlpiri(an Australian language) etc. Finally, Bengali sentences have been analyzed according to Chomskyan grammar. Bottom-up parsing technique and Context-sensitive rules have been used to design parsing algorithms. The designed parser can parse simple affirmative sentences for all types of tense i.e., Present, Past, Future and Habitual past tense together with all types of person i.e., First, Second and Third person. The algorithms can maintain the agreement of Person + Class between Verb form and Subject which is available in Bengali sentences. Words are stored into the dictionary (lexicon) together with lexical categories. Using these algorithms it would be possible to parse the Bengali sentences to let the users know whether those sentences are syntactically correct or not.

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Strategies, Issues and Challenges for Enabling e Governance in Bangladesh

Mohammad Zakir Hossain Sarkar*, Shaila Rahman**

Abstract

Everywhere in the world, especially in Asia, Africa and South America, governments are using the information and communications technologies in enhancing sustainable development. Bangladesh that lags far behind in this regard needs to put the ICTs at the heart of all of its advancement programs and strategies. These technologies can also expedite the country's progress in economic, social and political spheres. The traditional methods of growth and development will be replaced by the latest technology-based ways of development. This paper is intended the details of e-Governance including the scope of e-Governance, advantages of e-Governance etc. It also describes how and where e-governance can be introduced immediately to bring transparency, efficiency and faith in the operation of the governments. Few constraints and challenges are discussed along with the strategies to implement e-Governance in Bangladesh. At last it describes 7 stages strategy to enable e-Governance in Bangladesh.

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BER Analysis of Space Time Block Code for Data Relaying at the Physical Layer

M.R. Amin*, M. S. Alam*, S. Jahan*, Mustafa Hussain*, R.R. Joyee**, Aseem Batla***

Abstract

Space Time codes are practical techniques used to approach the theoretical multiple input-multiple output (MIMO) spectral efficiencies. Virtual Antenna Array (VAA) approach successfully gives solution to the problem of just one receiving antenna in a handset. In our proposed scheme space-time block coding is performed over transmit antennas that are not necessarily co-located. Distributed Space Time Block Coding has been analyzed to increase the performance of Space Time Code. In particular, the end-to-end bit-error rate (BER) of relaying mobile station is simulated and suitable design guidelines are given and the results are very promising at early stage of the development.

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Digital Logic Design, Dr. Md. Mozammel Huq Azad Khan, published by University Grants Commission, Bangladesh, 2006

Digital Logic Design

Md. Mozammel Huq Azad Khan*

This book is written as a textbook for Bachelor's programs of computer engineering, computer science, electrical Engineering, communications engineering, electornics and other disciplines. In the book, basic techniques and procedures of logical level designof digital systems are discussed. The techniques are presented from the classical point of view. Boolean algegra, truth tables are used for the analysis and design of combinational circuits and state transition techniques for the analysis and design of sequential circuits. Register transfer logic design and digital systems modelling and simulation using Verilog hardware description language are also emphasized. The book has been systematically organized and the presentation has been kept at a level suitable for a student with or without a basic knowledge of digital electronics.

* Department of Computer Science and Engineering , East West University

Intelligent Road Traffic System using Micro-controller based Wireless Sensor Networks

Kazi Khaled Al-Zahid*, Quazi Ehsanul Kabir Mamun****, Syed Murtuza Baker*,**
Chowdhury Golam Hossain*

Abstract

Wireless sensor networks bring an unprecedented level of performance and simplicity to the growing need for traffic monitoring on freeways, arterials and city streets. Recently a few vendors have already developed some sensor families of vehicle detection products. Wireless sensor networking is a breakthrough technology that combines sophisticated networking software with highly integrated radio and sensor chips to enable sensing applications on a scale and at a scale that were unthinkable until now. With the advent technology, it is now possible to deploy vehicle detection at a much higher density and at a fraction of the initial and maintaining costs of currently prevalent technologies such as inductive loops, video cameras and radars. In this paper we design a cooperative microcontroller based automated road traffic system. The system is economical and provides the functionality of real-time automatic route scheduling. Moreover this system will trigger new application such as roadside e-advertisement; accident alert etc. to create new business idea incorporating other technology such as GSM.

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An improved physically based compact C-V model for MOS devices with high-k gate dielectrics

Md. Itrat Bin Shams*, K. M. Masum Habib*, Rajib Mikail*, Q.D.M.Khosru*, F.Ferdous**,
A.N.M.Zainuddin**, Anisul Haque***

Abstract

An improved compact gate C-V model for MOS devices with high-K dielectrics is proposed. The model accurately includes the effect of wave function penetration into the gate dielectric. It is based on making the exponent λ, of the Airy function solution of the eigenenergy, dependent on the characteristics of the dielectric material and on the substrate doping density. Comparison with experimental C-V data shows that the proposed model is more accurate than existing models which consider a constant value of λ for all dielectric materials

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Anisotropy and non-uniformity effects on the strain relaxation in GaInAsP/InP quantum wire structure

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

Abstract

Calculation of the strain relaxation in membrane GaInAsP/InP quantum wire laser is performed using finite element method. Effect of strain-compensating barriers in multiple quantum wire stacks on the strain relaxation is investigated using both isotropic and anisotropic models. It is found that the difference between the two results increases when the wires are narrower and this effect is more pronounced in the barrier regions.

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Direct tunneling gate current in strained-Si/SiGe metal-oxide-semiconductor structures

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

Abstract

Direct tunneling (DT) gate current of deep submicron strained-Si (SS) on relaxed $Si_{1-x}Ge_x$ metal-oxide-semiconductor (MOS) structures is calculated under inversion bias for both n and p type substrates. Comparison of DT current between strained and unstrained devices has also been made under matched threshold voltage condition. It has been found that strain induced changes in DT current more complex in SS-pMOS devices than in SS-nMOS devices due to the inclusion of the bowing effect in the SS bandgap.

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Energy band structures of strained membrane quantum wires considering the redistribution of elastic strain relaxation

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

Abstract

Energy band structure of GaInAsP/InP compressively strained membrane quantum wires is theoretically studied using 8-band k.p method. Redistribution of elastic strain relaxation due to etching away of lower and upper InP clad layers in membrane quantum wires is considered in the calculation. It is found that strain redistribution increases the effective band gap of membrane quantum wire structures causing a blue shift of the emission frequency. Comparison with effective band gap calculation using a bulk-like approach neglecting confinement and band-mixing demonstrates that neglect of these effects leads to an over-estimation of the change in the band gap.

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Linewidth enhancement factor in compressively strained single- and multiple-layer InGaAsP quantum wire lasers

M Abul Khayer*, **Anisul Haque****

Abstract

Line width enhancement factor, also termed as the α-factor, of compressively strained (CS) InGaAsP/InP quantum wire (QWire) lasers is theoretically investigated using an 8 band k.p method including elastic strain relaxation effects. The structure under our consideration consists of vertically stacked single or multiple layers of In1-xGaxAsyP1-y compressively strained (CS) QWires with 1.07% misfit CS and lattice-matched (LM) or tensile-strained (TS) barriers grown on (001) InP substrate. In all our analysis, the height of the wires and the barriers are 7 nm and 12 nm, respectively, along the crystal growth direction. All the calculations are for TE gain which is dominant in CS structures. It is found that, for a certain wire width with either LM or TS barriers, α-factor is larger in case of single-layer QWires and is reduced with the introduction of the multi-layer stacks in the active region of the structures. Two competing effects take place in case of multi-layer stacks. On one hand, multiple layers increase the modal gain. On the other hand, material gain per layer is reduced due to increased strain relaxation. Therefore, the increase in modal gain in multi-layer stacks is less than what is normally expected. Our results show that α-factor depends on the device parameters, such as, wire width, barrier strain, number of vertical layers etc., in a complicated way owing to the complex interactions between 2D quantum confinement and elastic strain relaxation effects. These results are important for designing CS QWire lasers with reduced values of the α-factor.

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Modeling and characterization of gate capacitance for MOS devices with high-K gate dielectrics

Anisul Haque*

Abstract

A physically based quantum-mechanical model is presented for gate capacitance of MOS structures with high-K gate dielectrics. The self-consistent model incorporates wave function penetration effect through realistic open boundary conditions. It is shown that inclusion of wave function penetration is essential to correctly model the slopes and magnitudes of C-V curves for different dielectric materials. Using a linear approximation of the calculated relationship between the semiconductor accumulation capacitance and Si surface potential in moderate and strong accumulation bias, an accurate yet simple technique is developed to extract dielectric capacitance for high-K gate dielectrics. This technique may also be extended to extract other important parameters, including electron effective mass in the dielectric and electron barrier height at Si-dielectric interface, from C-V data.

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Size dependence of quantized energy levels in quantum dash structures

M. M. Islam*, Mohammad E. B. Quddus*, M.Q.Huda*, M. A. Khayer** **Anisul Haque*****

Abstract

Electronic states in a quantum dash structure are calculated using the so called single-band eigenfunction expansion method. This technique allows easy determination of the quantized energy levels and the corresponding wave functions by inverting a Hermitian matrix. Accuracy of our calculation is verified by comparing the results with those obtained from an accurate finite element method. The technique is applied to investigate the dependence of the quantized energy levels on the dimensions of the quantum dash structures.

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Acoustic Study of Bangla Phoneme for Computational Approach

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

Abstract

This paper discusses speech production mechanism with an emphasis to Bangla Phoneme processing. The various articulators involved in the production of speech spectra and the manner of articulation is discussed. The distinction between vowel and consonant is discussed both from the context of the linguistics and computation. The phoneme perception plays an important role in the classification of the phoneme. The paper covers discussion on the phoneme and its variations in the contextual speech production. The general model for the speech production based on computational approach is discussed along with the different processing of speech segment for effective parameter extraction.

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New Approach to Automatic Segmentation of Bangla Speech

Syed Akhter Hossain*, M Lutfar Rahman** , Farruk Ahmed*** Suraiya Pervin****

Abstract

In this paper a new approach to automatic segmentation of Bangla speech is investigated based on time domain analysis of segmented speech frame of Bangla utterance containing different class of phoneme both vowel and consonants by male and female speakers. This paper proposed an approach to automatic segmentation of sections of speech frames based on silence, voiced or unvoiced classes. The segmentation is accomplished based on the processing of the speech samples and calculation of zero crossing and short-term energy functions. The proposed approach produced good accuracy of segmentation of the order of 85% based on the threshold set.

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Research on Bangla Computational Linguistics in Bangladesh

Syed Akhter Hossain* , M Lutfar Rahman**

Abstract

The study of natural language is growing fast and at present it is an exciting area of research and development activities. This field has tremendous impact on diverse fields of knowledge like anthropology, sociology, cognitive psychology, computer science, neuroscience, artificial intelligence etc. Besides, the emergence of Internet as a global information repository requires intelligent information processing tools to help information seekers to retrieve the stored information. To empower the society with the information, we need to build computer applications that understand human languages. This paper highlights key issues in the development of research on computational linguistics in Bangladesh. Bangla, a language of nearly 300 million people around the world, is originated in the 11 century AD from a dialect commonly known as Prakrit. It is worth noting that there has not been much study for Bangla computational linguistics. This paper presents various aspects of computational linguistics and its progress through research and development works in the Western World, focuses research on computational linguistics in Bangla in Bangladesh and recommends activities to foster the computational linguistics relating to Bangla language.

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A Quantum Logic Circuit For Generating Fixed-Polarity Reed-Muller Coefficients

Mozammel H A Khan*

Abstract

Logic function representation using fixed-polarity Reed-Muller (FPRM) expression has manifold advantages over classical SOP expression. Moreover, FPRM expression is a very useful representation for logic function realization using quantum logic circuits. In this paper, we present a quantum logic circuit for generating FPRM coefficients for a given polarity vector from the truth vector of the function

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Post-EA Simplification of Ternary Reversible Circuit

M. M. R. Khan*, M. G. A. Sujan**, **Mozammel H A Khan***

Abstract

This paper presents a method to simplify ternary reversible circuits. Evolutionary Algorithm (EA) based methods are used to synthesis the ternary reversible circuits in most of the previous works in this field. But the obtained solutions are far from the optimal solution. Thus there are scopes to further simplify the obtained circuit to reduce the cost and complexity of the circuit. This paper presents a post –EA simplification method using some local transformations. Mainly this algorithm works with the EA based method in [21], but using the same principle algorithms could be developed easily that could be applied with other EA based methods. We proposed a number of local transformations and then developed an algorithm to simplify the circuit using those local transformations. It is found by experimentation that the proposed method improves the quality of solution significantly.

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Quaternary Galois Field Expansions for Reversible/Quantum Logic Synthesis

Mozammel H A Khan*

Abstract

Multiple-valued (MV) logic functions having many input variables can be easily expressed as Galois Field Sum of Products (GFSOP) expression and can be realized using cascade of MV Feynman and Toffoli gates. In this paper, we show ten Quaternary Galois Field Expansions (QGFE) using which Quaternary Galois Field Decision Diagrams (QGFDD) can be constructed for any quaternary function. By flattening the QGFDD, quaternary functions can be expressed as Quaternary Galois Field Sum of Products (QGFSOP) expression. These QGFSOP expressions can be implemented using quaternary 1-qudit gates and multi-qudit Feynman and Toffoli gates.

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Quantum Realization of Quaternary Feynman and Toffoli Gates

Mozammel H A Khan*

Abstract

Multiple-valued logic functions having many input variables can be easily expressed as Galois Field Sum of Products (GFSOP) expression and can be realized using cascade of multiple-valued Feynman and Toffoli gates. Conventional binary functions can be expressed very easily as quaternary functions by grouping 2-bits together. These quaternary functions can be expressed as quaternary Galois Field Sum of Products expression and can be implemented as cascade of quaternary Feynman and Toffoli gates. These gates are macro-level gates and need to be realized using technology based primitive gates. In this paper, we show the realization of quaternary Feynman and Toffoli gates on the top of theoretically liquid ion-trap realizable 1-qudit and 2-qudit Muthukrishnan-Stroud gates.

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A New Symmetric Key Cryptographic Algorithm for Unicode Compliant Bangla Characters

Mohammad Zakir Hossain Sarker*, Shaila Rahman**, M. Lutfar Rahman***

Abstract

Cryptography is the discipline that embodies principles, means, and methods for the transformation of data in order to hide its information content, prevent its undetected modification and/or prevent its unauthorized use. Cryptography generally takes one or several numbers as an input, performs some sort of calculations on those numbers, and produces another number as the output. Now-a-days most of the organizations are increasingly dependent on electronic data for various purposes. Since data travels electronically the alarming issue is the security. Cryptographic algorithms can play vital role to resolve this issue. There are two basic types of cryptography: Secret/Symmetric Key and Public/Asymmetric Key. Symmetric key algorithms are the quickest and most commonly used type of encryption. Here, a single key is used for both encryption and decryption. This paper describes a new Symmetric Key algorithm which can be applied on the Unicode compliant Bangla characters. Algorithms for both encryption and decryption are provided here. The advantages of the new algorithm are also described along with the drawbacks. Since government of Bangladesh is planning to introduce e-Governance this kind of cryptographic algorithm should be applied to secure various important and vital data As per as literatures are concerned, this kind of work for Unicode compliant Bangla characters has not been done yet i.e. this could be the pioneer work.

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Parsing Algorithms for Bengali Parser to Handle Affirmative and Negative Sentences

Mohammad Zakir Hossain Sarker*, Shaila Rahman**, M.A Mottalib*******

Abstract

This paper embodies the design of parsing algorithms tangibly for a Bengali parser. To design parsing algorithms a detailed study on linguistics and grammar has been performed and Bengali sentences have been analyzed according to Chomskyan grammar. Bottom-up parsing technique and Context-sensitive transformational rules have been used to design parsing algorithms. A detail discussion on these topics is incorporated in this paper. The designed algorithms can parse simple affirmative and negative sentences for all types of tense i.e., Present, Past, Future and Habitual past tense together with all types of person i.e., First, Second and Third person and their classes. The algorithms can maintain the agreement of Person + Class between Verb form and Subject which is available in Bengali sentences. These can also exhibit the freeness of the word order in Bengali sentences. Using these algorithms it would be possible to parse the Bengali sentences to let the users know whether those sentences are syntactically correct or not and also decides whether the sentences are affirmative or negative in nature.

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