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Abstracts

Sl. No.	Titles	Abstract
01	Determination Of Starting Points For Parametric Bézier Triangular Surface / Surface Intersections	<p>This paper presents a numerical algorithm for computing starting points on the curve of intersection between two parametric triangular surfaces. The problem of determining intersection curves between two surfaces is analytically formulated by parametrizing inequality constraints into equality constraints and augmenting the constraint function. The method uses the Moore-Penrose pseudo inverse of the constraint function to determine a starting point. Different numerical examples are presented to validate the method.</p>
02	A Combinatorial Approach For Information Hiding Using Steganography And Gödelization Techniques	<p>The growth of internet technology in the present era is creating a pressing need to develop several new methods for copyright protection, ownership and security of the digital contents. These concerns have triggered significant research to find ways to hide data into digital media. This paper proposes a new combinatorial algorithm for data hiding based on Gödel numbering [4]. Alphabetic Coding and modified auxiliary carry watermarking method [1]. The first is used for transforming data into Gödel numbers followed by the second stage, the resultant of which is encrypted using Alphabetic coding and then the modified auxiliary carry watermark method is used to hide the data in the third stage. Thus this proposed algorithm provides three levels of data security with low computational intricacies.</p>
03	Slow Cortical Potential Signal Processing For Fast Brain Computer Interface	<p>To find an effective communication channel which translates human intentions into control signals for a computer, the so called Brain-Computer Interface (BCI). One main goal of research is to help patients with severe neuromuscular disabilities by substituting normal motor outputs. Various cortical processes were identified which are suitable for implementing such a system on basis of scalp recorded electroencephalograph signal of 10–20 Hz brain rhythms. Until quite recently BCI systems used only few EEG channels but by use of advanced machine learning techniques it became possible to exploit the spatial information provided by multi-channel EEG. While the use of such high density spatial sampling increases the accuracy of the system it may depending on the computational effort of the signal processing pose a problem for the implementation of the feedback in real-time. Here we propose a method that offers a substantial speed-up for classification of slow cortical potential features as used in the Berlin Brain computer interfac [1]. Instead of applying the time consuming low-pass filtering to all, say 256, EEG channels a suitable spatial projection extracts only 2 or 4 new channels which can be used without any loss of classification accuracy in our experiments. Our approach is based on the technique of common spatial patterns which were suggested in [2] to extract ERD features from EEG. While in its original form CSP is only applicable to oscillatory features we present a new variant, which allows using CSP for SCP features without regularization even in case of large channel numbers or few training samples.</p>
04	Genetic Algorithm Based Performance Improvement In Retrieving Reusable Software Components	<p>Reusing a previously developed and tested software component is the key to improving the quality and productivity of the software. Reuse of existing software components lead to quick and quality software development. The main challenge in reusing the software component lies in the retrieval and selection of appropriate component that would need no or least adaptation, from software component repository. This paper reveals the comparison between various existing component retrieval techniques on the basis of various factors. A genetic algorithm based hybrid technique for retrieving appropriate component is developed and tested on a repository of fifty thousand components. This technique is a two-step search process, first it searches repository on keywords and their synonyms then in second step component weight vector is optimized using genetic algorithms to search appropriate components. This hybridization of keyword based search and genetic algorithm based optimization give better results as compared to any other single technique. The main strength of this technique is that it uses various implementation attributes of reusable components as component description in repository and it results in better precision.</p>

- 05 Set Theoretic Rajan Transform (STRT) - (An Extension of RT applicable to Sequences of Sets) Correction in the diagram
- In the July 2007 issue of the IJSCI, we proposed the formulation of Set Theoretic Rajan Transform (STRT) which is defined as an algorithm similar to that of Rajan Transform (RT) with the only difference that the numeric operation of SUM is replaced by the set theoretic UNION and the numeric operation of DIFFERENCE by the set theoretic SYMMETRIC DIFFERENCE. The signal flow diagram of a four-point sequence of sets was presented with some error in it. The correct diagram is given here.
- 06 A Full-Form Lexicon Based Morphological Analysis And Generation Tool For Punjabi
- Morphological analysis and generation are two essential and basic activities performed in any typical NLP (Natural Language Processing) application. Punjabi, a member of modern Indo-Aryan family of languages, has a rich system of inflectional morphology as compared to English and other such languages, therefore morphological analysis is almost essential for it. This paper presents the design and implementation of a full-form lexicon based morphological analysis and generation tool, Punjabi Morphological Analyzer and Generator, for Punjabi language. The lexicon of this tool consists of all the commonly used word forms of the Punjabi words. It then performs analysis and generation based upon that.
- 07 Power Consumption Estimation Per Unit Performance In High Speed Restoring And Non-Restoring Divider Arrays For CDMA Mobile Communication Systems
- Due to increasing multimedia related diverse user demanded services the digital wireless mobile algorithms are becoming more complex and computationally intensive. Computationally demanding digital signal processing algorithms require operand numeric fidelity and optimization of the circuit design at all levels to obtain low power consumption per unit performance. Division is more time consuming operation as compare to multiplication. Structured array circuit designs of divider units are suitable for high speed long word length multifunction arithmetic units and portable wireless digital signal processing algorithms. In this paper high speed non-restoring and restoring divider arrays are studied for obtaining low dynamic power consumption and power delay product using low power VLSI calculations. Low power consumption in both types of array divider units is obtained using the switching activity and average gate capacitance. Power consumption minimization per unit performance is achieved by joint optimization at different levels of structured array divider circuits. Input-pattern, logic function, logic style and circuit structure are the different levels considered for optimization. Dynamic power consumption is estimated by non-simulative probabilistic technique. It is shown that power delay product of high-speed restoring divider array is much less than basic non-restoring and iterative non-restoring array dividers for large word lengths. The design can be configured for division in one clock cycle.
- 08 A Novel Method On Link Power Estimation Of Modified Ethernet PON (MEPON) Architecture Using ADM As Remote Node For Dynamic Bandwidth Allocation Scheme
- It is an essential one to upgrade the current bottlenecked Optical access or Fiber-to-the-Home (FTTH) to deliver integrated triple play services (VVD- Video, Voice and Data) in future broad access networks. Passive optical network (PON) architecture is a necessary one and it is to be provided with more secured fiber based unlimited dynamic bandwidth access network at low cost while compared with wireless broadband access network. We have attempted here and propose a novel Dynamic Bandwidth Allocation (DBA) scheme called Modified Ethernet PON (MEPON) architecture using Tunable Fabry-Perot Filter (TFPF) at Optical line terminal (OLT) and Add drop multiplexer / demultiplexer (ADM) at Remote node (RN) as compared with the existing EPON architecture using splitter/combiner set up at remote node. In this paper we have been analyzed the cost effective link power estimation using normal mode iterative (NIA) and simulated sweep iterative analysis (SIA) for MEPON and found out its power penalty requirements at OLT and RN to all Optical network units (ONUs) or end users. We have found that the MEPON set up is possible to extend for high bit rate transmission ranges of 1.25 to 10 Gbps compared with EPON architecture. MEPON gives better stability on electrical and optical pulse transmission in terms of pulse power, bandwidth loss and adaptivity in architecture level.
- 09 Time – Domain Equalization Technique For Intercarrier Interference Suppression In OFDM Systems
- Orthogonal Frequency Division Multiplexing (OFDM) is a modern high data rate modulation technique for wireless communication systems. Due to loss of orthogonality of subcarriers Intercarrier interference occurs. In this paper the performance of the proposed time-domain equalization technique is compared with the existing Frequency domain equalization technique. In Frequency domain equalization a correlative polynomial is used in the frequency domain to suppress the ICI. In Time domain equalization technique, a

- window function is proposed in equivalent to the Correlative polynomial used in the frequency domain .MATLAB simulation of the proposed technique shows that the time domain windowing scheme achieves better performance in ICI suppression compared to the correlative coding technique. Time domain windowing technique proposed in this paper , offers better carrier to interference ratio (CIR) and BER is reduced compared to the correlative coding method..
- 10 Low Jitter Analog Phase Locked Loop Using Differential VCO
An analog PLL with fully differential characteristics is designed and simulated. It uses a four quadrant analog multiplier for phase detector and a fully differential current steering three stage ring oscillator as VCO. Experimental results show that the jitter obtained is less compared to PLL using single ended VCO. This circuit works at reduced voltage swing; it not only has the potential of operating at very high frequency but also dissipates less power at high frequencies than conventional CMOS logic.
- 11 Smart Automation With Firmware In Process Industry
The paper proposes an event triggered embedded system for the process industry. A process control system monitors a productive environment, production line where it controls the flow of motion in the predetermined limits set by the pre-emptive task scheduler. A lot of process industries are making up their minds on using embedded systems for process control in spite of older controller because of the reason of having diverse control options. The proposed real time system is a soft real time system. This pre-emptive scheduled system controls the process in a smart way using the analog transducers or sensors for monitoring, while the digital interfaces or actuators for the analysis & controlling applications. All this is possible through the development of firmware or device driver for the specific modules that are to be used. These device drivers for the I/O modules will bring smartness to the process of control. As for a case study a LPG bottling Plant is considered where the possible implementation of the embedded real time system with the possible device driver modules will take place.
- 12 Spectral Analysis Of EEG Signals During Hypnosis
Although Hypnotherapy is a powerful alternative for an array of neurological disorders, patients should be willing to be hypnotized and convinced that hypnosis works. For the successful treatment, it is absolutely essential for the hypnotherapists to ascertain that the patient is properly hypnotized, and therefore require a reliable method to find the mental state of the patient. Even among the hypnotic researchers, there is no consensus on what the reliable metric to use for tracking the mental status of the patients. In this paper we present a reliable method we developed. We designed a portable EEG amplifier to acquire the brain signal with high gain, and high accuracy. The response of the EEG signal before, during, and after hypnosis is studied for 10 subjects. The spectral analysis of EEG during hypnosis shows the frequency bands in theta and alpha range. During hypnosis all the subject's frequencies consistently fall in the higher theta₂ and smaller alpha₁ band of frequencies.
- 13 Software Development Life Cycle Reduction Time Modeling
Increasing software developers' productivity and reducing the software development process' cycle time are key goals for organizations responsible for building software applications. During the early days of commercial software development, cost and performance were the factors that received the most attention as an area for improvement. In the 1980's quality and productivity have received a great deal of attention. It appears that, in the 1990's reducing software development time will be one of the primary goals of large and small software companies alike. To this end it is appropriate to examine the factors that affect software cycle time. Is it enough to try and improve programmer productivity or are there additional products or process improvements that might be considered? Assuming there are several factors that impact software development time, what are they and how much of an impact does each factor have? This paper examines the software development cycle. It motivates the importance of software cycle time reduction. A definition for software cycle time is proposed. The objective of our research has been to provide decision makers with a model that will enable the prediction of the impact a set of process improvements will have on their software development cycle time. This paper describes our initial results of developing such a model and applying it to assess the impact of software assessments.

Homomorphisms play an important role in the study of systems. One of the important functions of homomorphisms is that they allow us to connect the results of one class of systems to those of an apparently different class of systems. A typical example of such connection to be found in classical systems theory is that provided in Steiglitz [53], where it is shown that the theory of continuous-time and discrete-time systems are connected to each other through a homomorphism induced by the bilinear transformation between the Hilbert spaces $L^2(-\infty, \infty)$ and $l_2(-\infty, \infty)$. What such a homomorphism essentially shows is that certain operations, relations and statements relating to these operations and relations are preserved under a particular mapping from the analog Hilbert space $L^2(-\infty, \infty)$ to the discrete Hilbert space $l_2(-\infty, \infty)$. One important question that arises about homomorphisms in general is: Are there any general conditions that operations and relations and statements involving them must satisfy so that they are preserved under homomorphisms? One way to deal with this question is that of Lyndon [39] who handles it in the framework of logic and algebra. Since we are dealing with the notion of signals & systems in logical terms, Lyndon's results are directly relevant to us. In this section, we reformulate Lyndon's homomorphism theorem in terms of constructive mathematical logic and investigate its applications for normal algorithms and constructive signal processing systems.