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Abstracts 1997-2006

Number 1,1997

A COMPRESSION TECHNIQUE FOR GRAY SCALE FINGERPRINT IMAGES

Serban LUNGU, Marius TICO

Abstract: The paper deals with a JPEG implementation for fingerprint image compression. A minimum value of signal to noise ratio for fingerprint images was established Using a special quantization table and LZW encoder, the implemented compression scheme can achieve about 10:1 compression ratio for fingerprint images. **Keywords -** fingerprint, image compression, JPEG, discrete cosine transform, quantization, bit allocation, peak signal-to-noise ratio.

A FUZZY METHOD FOR MANUAL, FAST ANALYSIS OF STATIC HAZARD IN DIGITAL CIRCUITS

C. MIRON, L. MICLEA, M. SABAU, G. OLTEAN, M. GORDAN

Abstract: One type of faults in digital circuits that is undetectable by the means of binary logic analysis is the static hazard due to the non-zero time of the circuit signal transitions. This type of static hazard is a design fault, and it is dependent of the specific circuit realization that implements the desired binary logic function.

In this paper, we propose a method for fast detection of static hazard, based on the fuzzy modeling of the digital circuit, represented at the gate level. Each gate is represented by a fuzzy algebraic relation, which gives its output as a function of its inputs. Based on the gate level structure of the circuit, we combine the fuzzy algebraic relations for the gates and obtain a fuzzy function which gives the output of the circuit as a function of its primary inputs; we call this function the fuzzy function of the circuit, and it characterize completely the circuit behavior regarding the presence of the static hazard on its output.

Keywords: fuzzy sets, fuzzy algebra, digital circuits, static hazard, logic gate, gate modeling.

INFLUENCE OF CIRCUITE PARAMETERS AND PERFORMANCE MODELING OF SIGMA-DELTA CONVERTERS

A. RUSU, S. LUNGU

Abstract: In this article we have used the results of the theoretical analysis and the facilities of the MATLAB program for modeling, analyzing and simulating a wide range of Sigma-Delta analog-to-digital converters. The results of simulation using MATLAB Toolboxes for Signal Processing, show the follows: the higher-order sigma-delta modulator provides more quantization noise suppression over the low frequency signal band and more amplification of the noise outside the signal band. Sigma - Delta A-to-D conversion allows the use of relatively imprecise analog circuits to perform high resolution conversion, using only a 1-bit A-to-D converter. Stability is the main problem for standard high-order sigma-delta modulators.

TESTING SYSTEM FOR ANALOGOUS BOARDS

Dan PITICA, Călin GHERGHE, Mihaela RADU, Mircea DABACAN

Abstract: The paper describes an 'In Circuit' testing method for boards equipped with analogue circuits, inspired from the technique used for digital systems. This method allows functional tests for a large range: of circuits, keeping the board plugged. There are presented not only the principle of the method and some theoretical considerations, but also aspects and performances regarding the implemented supporting hardware. Moreover, a final application example is provided in order to emphasize the advantages offered by this testing system. **Key-words:** functional testing, signature analysis, correlation

A SIMULATION METHOD FOR INDUCTION MOTORS

S. LUNGU , D. COSMA

Abstract: The paper presents a variable step method, which can be used for induction motors simulation. The model used for the induction motor is the two phase model ; the axes are related to the stator. The nonlinearities due to core saturation and to nonsinusoidal flux distribution are not taken into consideration. The integration method has a variable step and provides a short computation time, which is comparable with MATLAB integration routines. Experimental results are compared to the simulated results at the end of the paper.

METHODS FOR SYNTHESIS OF DISCRETE LINEAR TIME VARIANT SYSTEMS

Daniela TARNICERU , Valeriu MUNTEANU

Abstract : This paper develops a framework for the synthesis of linear time variant (LTV) discrete systems. In the proposed method, one determines the structure of a discrete controller, which is cascaded with the known time varying process, so that the ensemble behaves as a linear time invariant (LTI) system satisfying certain design requirements. The obtained controller is very simple, consisting of a parallel bank of IIR filters of the first order followed by amplifiers with time variable gain. Simulation results are included to illustrate the theoretical discussions.

CEPSTRAL ANALYSIS TECHNIQUE FOR SPEECH SIGNAL

Eugen LUPU, Gavril TODERAN

Abstract: Since their introduction, homomorphic signal processing techniques have been of great interest in speech/speaker recognition. There are two methods to compute the cepstral coefficients: Fourier Transform - derived cepstral coefficients and LPC (Linear Prediction Coding)-derived cepstral coefficients. Homomorphic systems were considered useful for speech processing because they offered a method for separating the excitation signal from the vocal tract shape so it can be obtained the pitch value and the cepstral smoothing of the spectrum

DESIGN OF A POWER FACTOR CORRECTION PREREGULATOR WITH ZERO CURRENT SWITCHING

Dorin PETREUS, Serban LUNGU

Abstract: This paper presents a design of a power factor correction preregulator with zero current switching. Design equations relating the boost inductor current, and switching times are developed and verified with measurements. Design guidelines for low-frequency feedback network are also presented.

NORTON AMPLIFIER LM 3900 - A BUILDING BLOCK FOR A TRIANGLE-SQUARE WAVE VCO

Andi CARCOTA

Abstract: Norton Amplifiers are less used than operational amplifiers, although their particularities may lead to simplified, efficient designs. A triangle-square VCO, designed around a quadruple amplifier, with a possibility to adjust mark/space ratio by altering only two resistors' ratio, is presented here.

A MODIFIED WIEN OSCILLATOR

Andi CARCOTA

Abstract: High quality, variable frequency RC oscillators are designed with dual gang variable capacitors as tuning elements. All successful designs have a major drawback : capacitors' common plate is not grounded, leading to unwanted coupling. This paper presents a new topology, that avoids this problem.

Number 2, 1997

SEGMENTATION OF FINGERPRINT IMAGES USING THE RIDGE DIRECTION

Marius TICO , Serban LUNGU

Abstract: Fingerprint image segmentation which consist in noise elimination and ridge restoration algorithms should be incorporated in the preprocessing stage of any fingerprint identification system. A robust segmentation method is very important in order to develop further efficient procedure of fingerprint encoding, storage and recognition. This paper deals with a new unsupervised fingerprint image segmentation method. Central to proposed segmentation method is the computation of

the ridge directions. In order to avoid the occurrence of false details in the fingerprint image a ridge gray levels regularization procedure based on directional information is used. The last stage of the segmentation method consist in the ridge pixels extraction by means of a local directional threshold. The proposed method was compared with other segmentation algorithms and the results show a significant improvement in identification performance.

SPICE MODEL FOR ZERO CURRENT SWITCHING QUASI-RESONANT BUCK CONVERTER

Serban LUNGU, Ovidiu POP, Silviu PLESA

Abstract : This paper is intended to explore in significant details of the quasi-resonant converter topology. Voltage and current waveforms and transferred charge are analyzed and simulated as function of time and input/output conditions. Specific and generalized design equations are given, which arc also applicable to other topologies.

Keywords: power supply, quasi-resonant converter, zero current switching, conversion frequency, SPICE simulating

DIGITAL IMPLEMENTATION OF THE NYQUIST FILTERING CHARACTERISTIC IN HIGH SPEED DATA COMMUNICATIONS

POLGAR Zsolt, TODEREAN Gavril

Abstract: The paper studies the digital implementation of the Raised Cosine (RC) and Root-Raised Cosine (RRC) Nyquist filtering characteristics, employing FIR filters with imposed linear phase characteristics. By computer simulations, the authors establish the minimum order of the employed FIR filter and the minimum sampling frequency required, in order to secure an acceptable approximation error of the RC and RRC characteristics, implemented by FIR filters, for different roll-off factors.

A NEW SPICE MODEL OF THE BAND - GAP VOLTAGE REFERENCES

Serban LUNGU, Silviu PLESA, Ovidiu POP

Abstract: Because the temperature DC analysis of the band - gap voltage references achieved by SPICE simulators provides errors, the components library file of the most known simulator (MicroSim 7.1. - Design Lab), doesn't contain any band-gap voltage reference. There are cases when we wish to know the variation law of the reference output voltage with temperature. This paper presents a detailed analysis of the effective temperature coefficient of band - gap voltage reference. A new SPICE subcircuit is given for the band - gap voltage reference analysis.

ANALYSING CURRENT FEEDBACK OP-AMP BASED VOLTAGE AMPLIFIER AND INTEGRATOR USING A TWO-POLES MODEL

Marius NEAG , Lelia FESTILA

Abstract: Most theoretical analysis of CFB-OA were based on simple first order models. Recently, Mahattanakul and Toumazou emphasised the importance of considering a more accurate model, especially the second pole $s = -j\omega$ terminating the stability and maximum operating frequency conditions. To illustrate this, they analysed the $j\omega$ noninverting voltage amplifier and the inverting voltage integrator with CFB-OA as basic amplifier. Mainly the classical feedback analysis was used, with its two usual approximations - both the basic amplifier and the i feedback network were considered unilateral - considered in order to simplify the algebra; unfortunately, this led to unnecessary approximations and even inaccuracies. The same CFB-OA applications are analysed in this paper using an extension of the classical feedback theory developed by the authors; the method is straightforward and provides an estimation of its errors, when comparing with an accurate analysis, at Kirchhoff 's laws level. An ordinary CFB-OA and a high-transimpedance CFB-OA design, with current mirrors with gain, have been considered; both one-pole and two-pole models have been used, providing for direct comparison. Besides the advantage of a more intuitive and simple approach, there are some differences between the results obtained here and the previously reported ones: first, the idea proposed by Vanisri and Toumazou, to increase the CFB-OA based noninverting voltage amplifier bandwidth by using the high-transimpedance CFB-OA, with current mirrors with gain, is reconsidered; second, the effects of the output resistances of input and output buffers within the CFB-OA structure, over the inverting voltage integrator parameters, are revised. Also, it is found that the high- transimpedance CFB-OA considerably extends the operational frequency range of the voltage

integrator. The theoretical analysis is validated by simulations.

AN IMPEDANCE CONVERSION SINE OSCILLATOR

GARNIER Eliane, MARCHEGAY Philippe, CIUGUDEAN Mircea

Abstract: The work develops the theory of an impedance converter quadrature sine oscillator, whose scheme was previously carried out [3, 4, 5]. One establishes the oscillation conditions and an analysis is performed on the output voltage quadrature precision. The resonant circuits and the very large quality factor are studied. Two realized schemes and the experiment's results are presented. The oscillator study shows its remarkable specifications as stability and selectivity.

DEVICE MODELLING WITH EVOLUTION STRATEGIES

Mihaela CIRLUGEA

Abstract: This paper describes an approximation method for experimentally obtained functions using Evolution Strategies. The results can be used in circuit simulation and modeling. The program in this paper is a development of Escapade 1.2 [1]. It has to find an appropriate codification as a basis for the new goat-function initially known as couples of (x-y) values. The obtained function is then refined with the mathematical method of the gradient and, finally, both functions, the experimental and the approximated, are plotted. The Evolution Strategies use the principles of organic evolution processes as rules for optimum seeking procedures. For the studied functions, a polynomial codification was chosen based on an alphabet of mathematical operations.

Number 1, 1998

MODELING AND QUEUING ANALYSIS OF VARIABLE- BIT-RATE MPEG VIDEO STREAMS

Anastasios DOULAMIS, Nikolaos DOULAMIS , Stefanos KOLLIAS

Abstract: In this paper modeling and queuing analysis of variable-bit-rate (VBR) MPEG coded video sources transmitted over B-ISDN networks are studied!. A low pass version of the aggregate MPEG sequence is examined so that the network resources are analytically predicted. Based on this simplified signal, a discrete-state continuous-time Markov chain is proposed to approximate the MPEG video traffic. Then, queuing analysis is performed for obtaining analytical solution of cell losses and average buffer size. The overall analysis is relied on a fluid flow approximation of MPEG video traffic, in which the queue can be viewed as a reservoir of water that is fed from water supplies of time varying rates and that empties through a fixed rate sink. Experimental results, indicating the good performance of the proposed model, are finally presented using MPEG coded video streams. Keywords: VBR MPEG video sources, Modeling, Markov Models and Queuing Analysis.

DEFINING THE AUDIO-CONFERENCE TELEPHONE SERVICE IN A LOW CAPACITY ELECTRONIC TELEPHONE EXCHANGE BASED ON SPATIAL SWITCHING

Petrut DUMA, Dumitru Nicolae ALEXANDRU, Luminița SCRIPCARIU

Abstract -The work presents the software implementation of the audio-conference telephone service for three subscribers, in a low capacity electronic telephone exchange with spatial switching network. There are also described the stages of realizing this service, the graph of states structure, as well as the structure of the multi-proce as system with uniform time processing division which implements this service.

STUDY AND DESIGN OF THE PFC SINGLE-STAGE SWITCHING REGULATORS

Serban LUNGU, Ovidiu POP, Silviu PLESA, Gabriel CHINDRIS

Abstract: This paper studies a particular single-stage power-factor-correction (PFC) switching regulator employing a discontinuous-conduction-mode (DCM) boost-input cell and a continuous-conduction-mode (CCM) forward output cell. It also presents the design method for boost-input cell and forward output cell and SPICE simulation of this scheme. As final results it's presents the values of total harmonic distortion and power factor for open-loop circuit.

Keywords: Power factor correction, switch-mode power supply, SPICE simulation

PROTECTION OF THE HIGH VOLTAGE BIPOLAR TRANSISTOR

Niculaie PALAGHITA, Cristian FARCAS, Cristina VLAD

Abstract: The switching behaviour of the high voltage bipolar transistor and his protection protection are treated in this paper. In the steady regime, no signifiant problem occurs, because v_{CE} and i_C are nearly zero (the dissipated power isn't important), while the turning off process subbmite the power device to an important electrical stress. The effect of parasitic inductances will be analyze in order to give solution how to protect the power device. Snubber circuits arc used as protection network on turn process. On the other hands, RLD circuits while assist the turn on process. Driving protection method is described in this paper.
KEYWORDS: HVBT, turn on, turn off, protection, Snubber circuits

ANALYSIS OF RF SIGNAL ENVELOPE DISTORTIONS IN AM RADIO RECEIVERS IN COMBINED AM AUDIO AND FM DATA TRANSMISSION

Vlad CEHAN, Nicolae D. ALEXANDRU

Abstract: Data transmission on a subcarrier that frequency modulates RF carrier is a feasible technique for superimposing data on AM signals. Limits of variation for subcarrier frequency and frequency deviation in order to produce a quasi-stationary state are determined. Also, envelope distortions of the RF signal that undergoes both AM and FM modulation, produced by its passage through narrow band circuits found in the front-end stage of the AM receivers are analyzed. Keywords: AM-FM, Data Transmission, Radio Communication

IDDQ TESTING

Dan PITICA, Călin GHERGHE , Mircea DABACAN

Abstract: In CMOS circuits, the fault detection problem becomes more complex because bridging faults create indeterminate logic outputs. Apart from the difficulty of sensitising, these faults present severe difficulties in fault-effect propagation. Designing a circuit under scan rules or BIST methods does not solve the problem. To overcome this problem, testing methods based on power supply current have been developed. These methods have been found capable of detecting bridging faults, open faults and some parametric faults such as gate oxide leakage in CMOS circuits. This technique is popularly known as IDDQ testing [1], In the paper it is described the basic concept behind I_{DQ} testing, its advantages, limitations and available implementation methods.
Key words: IDDO current testing, CMOS gate, fault-free current.

HIGH LEVEL DESIGN AND IMPLEMENTATION OF THE M-D NONRECURSIVE FILTERS

Adrian BURIAN, Mihaela CARLUGEA, Sorin HINTEA, Lelia FESTILA

Abstract: This paper presents high-level synthesis techniques for implementing from 1-D to multidimensional M-D nonrecursive digital filters. As the complexity of ASICs increases, needs for new design methods are obvious. New methods are needed to manage large and complex designs. Hardware description languages and especially VHDL serve as a flexible and efficient tools to achieve these goals.. The architectures presented in the paper are very regular and support single chip implementation in VLSI, as well as multiple chip implementations. The proposed systolic arrays, used in implementation of these algorithms, are optimal with respect to time.

Number 2, 1998

MATHEMATICAL ASPECTS IN SWITCHING ANALYSIS OF THE POWER MOS TRANSISTORS

Niculaie PALAGHITA, Doru CREANGA, Cristina VLAD, Cristian FARCAS

Abstract: In this paper is present mathematical aspect in switching analysis of the power MOS transistors. We calculated and represented graphic the following signals: I_B , i_C , i_{Gi} , v_{GS} , d_s . At the end, we make a simulation on MATLAB, with precise values. The simulated waveform could be compared with catalogue papers.
KEYWORDS: switching times, gate charge circuit, load current.

A NEW METHOD FOR IMPEDANCE MEASURING VIA RF COUPLED COILS

Sorin HINTEA

Abstract: Some medical applications need to transmit information or energy to implanted devices placed inside the human body via RF coupled-coils. In these

situations it is difficult to control the position of implanted coil and, as a consequence, the coupling coefficient k . This paper describes a particular application which permits Li insensitive transmission link. There are presented the theoretical relations and also the simulation and experimental results. It is introduced a class D amplifier scheme in order to improve the circuit's performances. I present here a new application of signal transmission via RF coupled-coils: how to measure impedance without electric contact by implanted devices. This application is based on the insensitive transmission gain in this kind of circuits. The method is theoretically demonstrated and it is simulated by PSPICE. The restrictions are discussed and the measuring range is presented. I discussed the possibility of using class D amplifiers and the consequences of this. Key words: coupled-coils, insensitive gain, impedance measuring, implanted device, class D amplifier

DIFFERENTIAL IMAGE COMPRESSION

Luminita SCRIPCARIU, Petrut DUMA

Abstract: In this paper a binary image coding technique is proposed. Its purpose is to ensure a better image compression rate, maximizing the white pixel area. Performances of image compression using partitioning into rectangular regions [1] may be improved using the proposed image coding method. It also be used for more efficient image segmentation, edge detection and for artificial or natural textures processing [2]. The binary image matrix is processed in two orthogonal directions, along rows and columns, from left-to-right and from top-to-bottom, running exclusive-or function of a pair of pixels separated by some other values. A simple algorithm reconstruct the original image. Test images of different types, sizes and complexities are used to prove the efficiency of the presented method.

STABILITY ANALYSIS OF HIGH-ORDER SIGMA-DELTA MODULATORS

Ana RUSU, Serban LUNGU

Abstract: A stability analysis method for delta-sigma modulators using a linear model for modulator is described. This method draws out the dependence of stability on system parameters such as integrators gains or quantizer gain. Furthermore, we show that a stable third-order modulator will become unstable as the input signal amplitude is increased beyond a certain threshold. In this paper we have used the results of the theoretical analysis and the facilities of the MATLAB software for analyzing the stability of the sigma-delta modulators. The method can be extended to high-order sigma-delta modulators.

Keywords: analysis, stability, model, modulator, delta-sigma

SOME METHODS FOR SUPERIMPOSING DATA ON AMPLITUDE MODULATED RADIO SIGNALS

Vlad CEHAN, Nicolae D. ALEXANDRU

Abstract: Data transmission using existing broadcasting AM transmitters must satisfy some essential requirements. A few possible solutions are translating the spectrum of the data bearing signal or exponential modulation of the RF carrier by the data signal or by a subcarrier. Translating the data spectrum is not a feasible solution. The possibility of data transmission using either amplitude or frequency modulation on a harmonic subcarrier that in turn frequency modulates the RF carrier of an existing AM broadcast radio transmitter is proved. The essential requirements are further investigated for this case. Using a complex modulation (both ASK and FFSK) one can ensure both phase and frequency of the RF signal.

MAXIMUM LIKELIHOOD DECODER USING HOPFIELD NEURAL NETWORKS

Sorina ZAHAN

Abstract: In this paper a neural approach to the decoding of error correction block codes will be presented. The decoder uses continuous Hopfield memories, pertaining thus to the class of soft decoders. Nevertheless it can be used as a hard decoder, if necessary. Due to the properties and behaviour of the Hopfield networks, the decoder acts on maximum likelihood bases. For this reason we named it neural maximum likelihood decoder (NMLD). It offers important advantages compared to classical hard and soft decoders but also compared to the neural hard decoder we have proposed in a previous work. The experiments revealed good decoding performances, underlining the interesting behaviour of the Hopfield networks, which, once again, proved to be not enough exploited.

Keywords: Hopfield neural networks, error correction, soft decoding, hard decoding

Number 1, 1999

QRS DETECTION WITH A CREATED TEMPLATE FROM THE ECG SIGNAL THROUGH INTER-CORRELATION

I. P. MIHU

ABSTRACT. In purpose of the identification of the QRS complexes, the encouraging practical results obtained through the correlation of the ECG signal with template matching shows that the performances are better as the matching of the template with the real form of a QRS complex is better. That's why for the monitoring in real time of a cardiac patient, the playback of a program sequence is possible, which in the first moments of the monitoring must have as a target to determine a template taken exactly from the ECG signal, came from the patient. After a remake, this template will be used during the entire effort test. The trade of the solution proposed in this article, consists in the fact that the digital processing algorithm conceives the "self correlation" of the ECG signal. In the same time it removes the isoelectrical line derivation effect. Although it treats a precise signal (ECG), the solution could be extrapolated and used to identify specific shapes within other signals.

EXPERIMENTAL RESULTS OF TRAFFIC MODELS FOR BURST DATA AND VOICE SOURCES IN ATM NETWORKS

Virgil DOBROTA, Daniel ZINCA

Abstract: This paper presents an overview of the existing traffic models for burst data and voice sources in ATM, as well as some experimental results and comments about their implementations. The first paragraph is devoted to burst traffic generated by ON/OFF sources of constant throughput. The Matlab-based scheduler is able to determine the number of ON cells to the number of OFF cells ratio, for every burst, until the transmission process is completed. In the cases of multiple constant bit rate sources or a single source of variable bit rate, the superposition of several independent models previously discussed can be applied. This is method is not useful for voice traffic, possible solutions being offered by Markov-Modulated Poisson process model or by fluid source model. Experiments carried out gave the Matlab-based schedule of ATM cells departure, generated by 5 multiplexed sources.

SYSTEM LEVEL MODELING OF THYRISTOR RECTIFIERS

Liviu MODRAN

Abstract: Some simple and effective thyristor rectifier dynamic models, suitable for the study of high power rectifier systems within the MATIAB/SIMULINK environment, is presented. This non linear, fast and accurate model, which accepts, as inputs, the pulse number and the trigger angle, is adequate for any pulse number greater than one, for all rectifier associations and reproduces the static and dynamic features of a real rectifier. The overlap phenomenon can also be included at the expense of some simplicity and simulation speed.

DATA ACQUISITION SYSTEM ON PARALLEL PORT

Ioan CIASCAI

Abstract - In very many experiments or laboratory measures it arises the problem of measuring analog signals with high precision which must be process on a compatible IBM-PC computer. The realization of a good acquisition system is generally expensive, and several problems appear, especially in making PCB, supply sources decoupling and noises induces by switching supply sources. The system presented in this paper has a very low price, is very simple and can be made very easy. Also the system can be made on an experimental board without affecting the precision, if the decoupling of power sources and reference is done like it's presented in the data book

TECHNOLOGY MAPPING FOR MULTIPLE-VALUED CIRCUITS

Dorin SIMA

Abstract: The task of logic synthesis is to convert the logic description of set function into a netlist of gates that implements the functions. This paper describes the possibility of implementing some combinational and sequential circuits with multiple-valued PLAs (MVPLA) or by multiple-valued multiplexers (MVLMUX). The algorithms are based on multiple-valued decision diagrams (MDD) representation of the functions

OPTIMISATION OF THE "FAN" COMPRESSION ALGORITHM

Ioan P. MIHU

ABSTRACT. This article presents a compression algorithm through the fan method, applied and optimised in a specific way to the signal obtained from ECG and having as a purpose, the conservation of data of cardiac patients under observance. The support of the method, just as the mathematical apparatus that stood at the base of implementation, and finally the original criteria for optimisation of the specific implementation for each patient separately, are presented.

Number 2, 1999

PERFORMANCE AND AVAILABILITY CRITERIA FOR DIGITAL RADIO-RELAY AND SATELLITE SYSTEMS

Tudor PALADE

Abstract: This paper deals with the study and comparison between the G.821 and G.826 ITU-T Recommendations. The error performance and availability objectives have been pointed. The G.821 parameters are based on bit errors while G.826 parameters are based on block errors. The relationship between block-error and BER has been analyzed and a method has been described that makes it possible to convert old bit error measurements into block-errors which can be evaluated according to G.826 parameters. The error performance objectives according to G.826 are known to be more stringent than G.821 objectives. This fact has to be taken into account when predicting outage probabilities. In the concept of unavailability all causes of quality degradation should be taken into account not only the propagation effects.

Key words: digital radio-relay performance and availability, bit errors, block errors.

THE REFLECTIONS PRODUCED BY LUMPED LOAD OF DIGITAL SIGNAL LINE

Virgil GOLUMBEANU, Paul SVASTA

Abstract: In interconnection technique of digital circuits in general the matched lines method for reducing the influence of reflections in a view to a good working of interconnected circuits is used. Parallel terminated transmission line is often used. Due to the input capacitance of digital circuits appears a reactance load. Although the matching is very good realized from the viewpoint of the resistive load, there is a reactive mismatching that can produce reflections at high frequency. Using Laplace transformation the reflections produced by parasitic capacitance load will be determined. These reflections will be analyzed depending on the type of the digital circuits and the parameters of the interconnection line. For some types of digital circuits the maximum fanout from this point of view, will be determined.

A SIMPLE METHOD FOR THD-COMPUTING

Gavril TODEREAN, Andras BALOGH, Balazs SZEKELY, Dezso DENES

Abstract; This work presents a time-domain method for Total Harmonic Distortion (THD) computing, avoiding the classical harmonic analysis (FFT). The proposed formulas are intended for microcontroller-based AC-Power measuring instruments, using the digital signal processing of the voltage and current waveform. We assume a simplified waveform acquisition, without anti-aliasing filtering before

sampling. However the theoretical aspects of undersampling are well known, we try in this work a cantitative evaluation of the error implied in THD-computing. We compute the THD in both time- and frequency-domain, using as test signals four analythically known, periodical waveforms. The signals are produced by Fourier-synthesis, resulting a high resolution digital representation of the test waveforms. The THD-value obtained with our method applied over the test signals is compared to the true THD-value, obtained by summing the first 100 (more then all relevant), exactly known harmonic components. The simulation is done over four waveforms, taking as variable the number of samples/period and the number nuber of significant harmonic components present in the test-signal, trying out two numerical integration methods. The relative errors obtained are collected in tables. The simulation does not cope with the finite word-length effect, which occurs in a real implementation.

Keywords: THD, errors, FFT, simulation, computational cost

REGION-BASED FRACTAL IMAGE COMPRESSION USING DETERMINISTIC SEARCH

Macarie BREAZU, Gavril TODERAN

Abstract: The paper introduces a new method based on deterministic searchii to fractal image compression. In order to find a good region-based partitioning, we propose a deterministic search method for finding the blocks to be merged. For each range, a list of best N domains is maintained. When two ranges are to be merged and their common edge disappears, for the new range the best N domains are selected only from the 2xN domain extension of the two ranges. At each step the edge with minimum collage error increase is deterministically selected and the two corresponding ranges are merged. The process starts with atomic blocks as ranges and ends when the desired number of ranges is achieved. In order to reduce the encoding time, a suboptimal initialization method is also considered. Experimental results prove that our method yields a better rate-distortion curve than the classic quad-tree partitioning scheme.

Speeding up the fractal image encoding by six-class statistical classification

Mihaly MILIAN , Denes PAZMANY

Abstract: Lossy image encoding by Partitioned Iterated Function Systems, also known as Fractal Image Compression has recently became an attractive research area. As a result of the collage theorem (Banach's fixed point theorem) in metric space theory, with a few constraints a complete set of contractive transformations is guaranteed to produce an approximation to an original image when is iteratively applied to any initial image with the same H/V ratio. While quick decompression algorithms exist, the compression process due to an exhaustive search is extremely time consuming. The most common solutions to this problem involves classification methods of domain and range blocks (the inputs and the targets of the transformations) according to some criteria, such as the existence of sharp edges or smooth areas, after which matches across class boundaries are excluded.

We propose a six-class classification of image blocks based on the uniformity of it's quadrants. The decision is made depending on the dispersion to mean value ratio comparing the value computed for a block with those resulted for the four quadrants on a logarithmic scale. This approach results in an important speed up of the encoding process while the quality of the reconstructed image remains the same.

Number 1, 2000

MIDI VIOLIN IMPLEMENTED ON TMS320C31 DSP STARTER KIT

Adrian FRATILA, Eugen LUPU

Abstract: This paper will discuss the technical design of a MIDI Violin, an interface between a classical violin and a synthesiser, more exactly the possibilities to transform in real time an audio signal into a MIDI signal, the last used as protocol for the digital transmission of audio events between synthesisers. To transmit music as MIDI messages we need to know the values of

amplitude and fundamental frequency of violin sound. The proposed solution for the fundamental frequency estimation is based on direct methods performing first a rough fundamental frequency estimation using DFT and then around that fundamental frequency to calculate the Chirp Z Transform which can deliver a fine frequency resolution, approached to the human ear perception. The application has been implemented using a TMS320C31 DSP Starter Kit with an extension board designed by the author that board contains 128Kwords (32 bits) SRAM , 32Kbytes EEPROM for the boot operation and a MDDI IN/OUT interface.

QUALITY AND AVAILABILITY IN MOBILE SATELLITE SYSTEMS

Tudor P.PALADE, Ioan CHISALITA, Nicolae CRISAN, Mircea ARUNCUTEAN

ABSTRACT: Fade margins for mobile satellite systems with forward error control operating in Ricean fading channels is considered. The fade margin is calculated according to combined criteria where quality requirements on both the average bit error rate and the instantaneous bit error rate is imposed during the time the system is available. This approach result in considerable less calculated fade margins compared to the traditional approach based purely on the channel fade statistics.

LAYER 4 SWITCHING IN A TCP/IP ENVIRONMENT FOR THE ATM SOURCES

Virgil DOBROTA, Daniel ZINCA, Cristian Mihai VANCEA, Aurel VLAICU

Abstract: This paper is focused on the results of a Layer 4 switching experiment, aiming to evaluate the performances at the interface between the applications and the nonblocking stream-oriented sockets in TCP/IP. One major objective is to apply the traffic models for burst traffic and video sources, initially designed for ATM sources, to user applications requesting transport layer services.

A NEW THREE-PHASE MULTILEVEL VOLTAGE SOURCE INVERTER

M. Lucanu, N. Cozma-Popescu, N. Lucanu

Abstract: The paper presents a new topologies of three-phase multilevel inverter. The correct operation of the inverter was verified by simulation.

ANALOG MODELS FOR ANALYSIS AND DESIGN OF SOME SWITCH CAPACITOR CIRCUITS

Lelia Festila, Mihaela Cirlugea, Calin Coltea, Corneliu Rusu

Abstract : Unitary and systematical analog models for analysis and design of some switched capacitor (SC) circuits are presented. These models permit a direct connection to s domain and a simple determination of the SC circuit function. They also permit the reconfiguration of a RC-OA circuit, so that it should be implemented in the SC mode. The proposed analog models adapted for the SC circuits avoid the confusions introduced by usual analog models used in literature in the same purpose. We analyzed and designed some circuits taken from literature as example and proved the simplicity and efficiency of this method.

ELECTRONIC DEVICES MODELING BY FUZZY LOGIC INTERPOLATOR

Gabriel OLTEAN, Mihaela GORDAN

Abstract: An important application of fuzzy logic systems is the approximation of non-linear curves. This application has been successfully used in device modeling based on their response to one input stimulus; an example is the $I(V_D)$ characteristic modeling for a diode [3]. In this paper we propose a generalisation of the fuzzy modeling from [3] to the modeling of a three-dimensional surface $y(x_1, x_2)$ and an application of this fuzzy modeling principle to describe the electronic devices behaviour, when this behaviour depends on two input variables. As an example we consider the current dependence on voltage and temperature for the rectifier diode, $I(V_D, T)$, and the transistor characteristic $I_c(V_{BE}, V_{BC})$.

TWO CAN BUSES REAL-TIME COMPLEX SYSTEM

Laurentiu DIMITRIU, Liliana VORNICU

Abstract: In this paper we present a two CAN buses real-time complex system. Using an original approach of system's timing we propose a powerful structure of internal data transfer. This is based on the features of Control Area Network (CAN) protocol, developed by Bosch. Considering a multi-processor structure, we have grouped the systems on functional criteria and use an external bus to interconnect the systems. Each system has an internal bus for its data transfer purposes. To amplify the system's possibilities, we propose the use of a multiplexing circuit to multiplex the internal serial buses.

ASSOCIATIVE MEMORIES ON CELLULAR NEURAL NETWORKS USING THE EIGEN VALUES DECOMPOSITION METHOD

Corina BOTOCA

Abstract: It is presented and theoretically justified the eigenvalue decomposition design method for an associative memory, or a cellular neural network. Introducing the condition of symmetric interconnections it is developed a new design method. This method generates a completely stable associative memory. Some simulation results are exposed and the performance of the obtained associative memory is compared with other differently designed CNN memories.

A WATERSHED ALGORITHM AND IT'S APPLICATION IN IMAGE SEGMENTATION

Arpad Zsolt BODO, Romulus TEREDES, Monica BORDA

Abstract: One of the most interesting and useful outcomes of mathematical morphology is the watershed operation. Algorithms, which result this operation, are numerous. This work describes one of these sequential algorithms, and also the operations needed for its implementation. The watershed operation or transform is a choice of image segmentation method in the field of mathematical morphology. Various examples are given, which shows the largeness of the applicability of this watershed algorithm in segmentation.

ON GENERALIZED WELCH MULTISSETS SEQUENCES FOR SYNCHRONOUS-CDMA CHANNELS

Paul COTAE, Felix DIACONU

Abstract: In this paper we describe the properties of those sequences (matrix) that meet equality in the Welch's lower bound (WBE) on total squared correlation. The generalized WBE sequences (matrix) are defined. A new algorithm for generating WBE spreading sequence multisets is proposed. We apply the proposed algorithm when all users have different average-channel-input energy constraint in the case of synchronous COMA channels. We obtain real optimum signature sequences that maximize the sum capacity of S-CDMA channels.

A NEW METHOD TO DEDUCE THE VOLTAGE TRANSFER CHARACTERISTIC FOR SOME TWO-PORT NETWORKS

Gabriel OLTEAN, Mihaela GORDAN, Ioana OLTEAN

Abstract: A new method to deduce the voltage transfer characteristic for two-port networks containing bias sources is presented. The method allows the deduction of the transfer characteristic only by translating a known transfer characteristic in the input voltage-output voltage plane; this way the analysis of the whole circuit is no longer necessary. Also the method can help to redesign a circuit in order to obtain a circuit that keep unchanged the shape of the transfer characteristic, while changing its location in the input voltage-output voltage plane. The method is important from the didactical point of view, giving to the students new insights about some electronic circuit analysis and design.

SURFACES RENDERING OF MEDICAL IMAGES

Aurel VLAICU, Nicolae CRISAN, Radu LUCIAN

Abstract: The paper presents a three dimensional rendering method which accomplishes very good results in the field and needs only the 3D surface information and not the whole volume of data, as other algorithms in the literature. Thus, only the shape information is used for the reconstruction, using less voxels that have to be read from the 3D volume and, thus, less time for the display of the object on the screen. The main disadvantage is that no information is available for volume visualization. The matter is questionable, though, since a volumetric algorithm can solve this problem, in which case no shape rendering is necessary. The method presented in the paper assumes that the edge information is available and stored already on disk. No interpolation algorithm is needed before this, because all the operations are done in the same time as the algorithm itself. The main idea is to implement an algorithm of 3D surface rendering for medical images of human organs, acquired from CT's or MRI systems, using the wire frame method, which is usual in 3D graphical visualizations.

PROGRAMMABLE PSEUDO-RANDOM GENERATOR

Viorel OLARIU, Sorin OLARIU

Abstract: Pseudo-Random (PR) sequences are used as spectrum-spreading (SS) modulation for direct sequence SS design, as hopping pattern sources in frequency and/or time hopping systems, and as filter section controllers in matched filter SS systems. The basics of linear feedback shift register (LFSR) are described for short. A complex programmable PR generator is proposed and investigated. The paper also presents the on board high-resolution frequency synthesizer and the quadrature modulator.

A REAL TIME APPLICATIONS AND NON-REAL TIME APPLICATIONS EXECUTING ALGORITHM

Liliana VORNICU, Laurentiu DIMITRIU

Abstract: A complex system contains real time applications and also non-real time applications. In distributed complex systems working on high speed processors, the system's applications executing becomes difficult because the non-real time applications have deadlines high values, theoretically infinite and the timing constraints are absent. By choosing a proper executing algorithm, the real time applications and the non-real time applications can be forced to respect their timing constraints, periods and deadlines. So, the executing problems in a complex system are solved concerning these constraints.

STUDY OF THE PERFORMANCES OF DIGITAL AUTOMATIC GAIN CONTROL METHODS BASED ON THE ENERGY OF THE RECEIVED SIGNAL

Zsolt A. POLGAR, Gavril TODEREAN

Abstract: The paper presents in details a certain automatic gain control (AGC) method frequently used in digital modems, based on the computation of the received signal energy, and a study concerning the performances of this method. Such a study is important especially in the case of the modems which do not use adaptive equalizers, due to two motifs: the level variations introduced by the transmission line increase the error probability after demodulation, and they can affect other circuits of the modem, increasing also indirectly the error probability.

The performances of the AGC circuits, as the performances of other circuits of the modem, are affected in a crucial manner by the intersymbol interference due to the filtering of the data signal. One of the main purposes of the present study is to emphasize the effects of the intersymbol interference on the performances of the considered AGC circuit and to present some to these problems. The obtained results could be generalized to other AGC circuits, with some approximations.

A FAST AND SIMPLE APPROACH TO CHARACTER RECOGNITION BY FUZZY IMAGE MODELING

Mihaela GORDAN, Eugeniu MECIU

Abstract: A simple class of techniques for character recognition is the one based on searchable databases, when the character described by some features is compared to a number of models described by the same features, and the character is labeled according to the best matching. The recognition speed mainly depends on the number of operations required for the comparison. The character recognition system must be insensitive to character rotation, distortion and additive noise. Usually both requirements: speed/robustness are not easy to attain. Here we propose a fuzzy logic-based system for character recognition, faster than some existing solutions, with reasonable invariance performances.

A METHOD OF SINE ROM COMPRESSION IN DDS

Viorel OLARIU, Sorin OLARIU

Abstract - The spectral purity of the direct digital synthesizer (DDS) is determined by the resolution of the values stored in the sine table ROM. Therefore, it is desirable to increase the resolution of the ROM, Unfortunately, larger ROM storage means higher power consumption, lower reliability, lower speed, and greatly increased cost. The basic memory compression techniques are briefly investigated. A new memory compression technique is proposed and investigated in detail. Computer programs have been created to generate the lookup table and to simulate the effects of the memory compression.

Keywords: sine ROM compression, lookup table, direct digital synthesis, frequency synthesizer

SOME OBSERVATIONS REGARDING THE REFLECTION LOSSES

D, Pitica, C. Farcas

Abstract: This paper presents some observations regarding the reflection losses. The paper presents reflection mechanism for plane-waves. The attenuation factor by reflection is calculated in the far field region and in the near field region (for E-field and H-field). Also, is presented a comparison between attenuation factor for plane wave from calculus and the real attenuation factor for plane wave.

DEDICATED ASSISTED DIAGNOSIS USING AN IMAGE ANALYSIS APPLICATION

Mircea VAIDA, Arghir SUCIU, Titus MOLDOVAN

Abstract: Image Analysis can offer useful results in the process of clinical diagnosis. Interactive measurements offer good results especially in research activity. Frequently, in clinical diagnosis we need to make automated measurements with and adequate visualization of the analyzed particles or regions of interest. These measurements depend on the image quality and the type of measurements that must be done. Our application offers some facilities referring to image processing and pattern recognition and some dedicated elements of stereological, AgNOR and DNA measurements for assisted diagnosis. Results visualizations are very important to consider in the automated process of measurements. The DNA measurements process will consider an intelligent Look Up Table that preserve the intensity of the image. New aspects and features that can offer better results were also considered. New considerations referring to multi-sensorial pattern recognition techniques are also considered

Number 1, 2001

SECURE COMMUNICATION SYSTEMS USING THE TMS320C5xDSP

Irinel Valentin PLETEA, Ion BOGDAN, Nicolae Dumitru ALEXANDRU

Abstract: This paper describes and characterizes secure communication systems over the Public Switched Telephone Network (PSTN). Global solutions are presented concerning the secure transmission of speech, data and facsimile group 3 signals. The areas covered by this work are source coding/decoding and ciphering/deciphering.

A METHOD FOR PREDICTING ERROR PERFORMANCE AND UNAVAILABILITY DUE TO RAIN ATTENUATION

Tudor PALADE

Abstract: In order to predict error performance and unavailability according to ITU-T Rec. G.821 (and later on Rec. G.826) a distinction must be drawn between available and unavailable time. Error performance is specified for available time with a recommended measuring time of one month. For DRRS (Digital Radio Relay System) the worst month concept is used. The term unavailable time is defined in G.821. Unavailability is specified for a measuring time of one year or more. Rain attenuation is considered as a flat fade within the occupied bandwidth, which means that there is an obvious relationship between BER and input signal levels. For a given system, rain attenuation is easily converted to input signal level by subtracting it from the clear air reference level. Taken this into account, and using predicted annual and worst month rain attenuation distributions, the suggested method can be used to predict error performance and unavailability due to rain attenuation.

PERCEPTUAL SPEECH ANALYSIS

Pop G. Petre

Abstract : Perceptual analysis emulate human ear non-linear frequency response by creating a set of filters on non-linearly spaced frequency bands. Bark and Mel scales are the most used perceptual scales. PLP (Perceptual Linear Predictive) analysis is a combination between FFT method and LPC method which modify the short-term power spectrum by means of a series of transformations based on physiological and psychological reasons and finally compute cepstral coefficients. Mel cepstral analysis use a cepstral smoothing in order to get the final smoothed spectrum.

SOME ASPECTS REGARDING THE DIGITAL GENERATION OF THE (CO)SINUSOIDAL SIGNALS EMPLOYING THE TAYLOR SERIES DECOMPOSITION

Vasile BOTA, Zsolt A. POLGAR

Abstract: The paper analyses the approximation error and the total harmonic distortion factor of the sinusoidal and cosinusoidal signals generated digitally using the approximation of the (co)sine functions by Taylor series decomposition. It presents the effects of the number of series terms retained after the series truncation, upon the two parameters of the generated signals, for different decomposition points and intervals. The effects of the finite format representation of the series coefficients, within fixed point DSPs, on the generated signals are analysed, as well.

DSP SOLUTIONS FOR BLDC MOTORS

Irinel Valentin PLETEA, Dimitrie ALEXA

ABSTRACT: This paper presents the control of Brushless Permanent Magnet DC motors using the TMS320C24x. This new family of DSPs enables single chip, cost effective, a modular and increased performance solution for BLDC drives. A solution is presented below: control structures, power hardware topology, shaft position sensors, control hardware and remarks on energy conversion efficiency can be found in this document. In addition, this report deals with sensorless algorithms as an alternative to position sensors for speed control.

PERFORMANCE EVALUATION OF LAYER 4 SWITCHING IN IPv6 VERSUS IPv4

Daniel ZINCA, Virgil DOBROTA, Cristian Mihai VANCEA

Abstract: This paper is focused on a Layer 4 switching experiments of IPv6 over Fast Ethernet, running under Windows 2000 Professional. Prior to our studies on IPv4 over ATM with TCP relaying, firstly introduced at IEEE LANMAN'99, we are trying to evaluate the performances at the interface between the applications and the nonblocking stream-oriented sockets in TCP/IP. The first major objective is to get consistent results for a IPv6 versus IPv4 debate, even the implementation phase of this new version of the Internet Protocol is under progress. The second objective is to propose a method for measuring the round-trip-time RTT at the Application Layer. It will provide 1 nanosecond - accuracy, that is requested by the new technologies such as Gigabit Ethernet.

FUZZY COMPUTING OF INITIAL SOLUTION IN ANALOG CIRCUIT DESIGN OPTIMIZATION

Gabriel OLTEAN

Abstract: A new fuzzy based method to compute the initial parameter values for the optimization design phase of electronic circuits is presented. A Mamdani type fuzzy system models the relations expressing the dependencies between circuit parameters and circuit functions. This fuzzy system is able to compute the values of design parameters for every set of design requirements. This way, the optimization phase has a good, automatic computed, starting point. Using this approach for a CMOS operational amplifier, initial solutions were computed for several sets of design requirements. Some of our results are much better or comparable than the ones presented in the literature.

AN IMPROVED SYNTHESIS METHOD BASED ON STATE VARIABLES OF G_m-C FILTERS

Doris LUPEA

Abstract: This article presents an improved synthesis method based on state variables of G_m-C filters. Our method presents the advantage of a reduced number of transconductors for the implementation of the G_m-C filters, unlike the case when the usually known method with state variables is applied. This can be put into practice if some transformations are being made to the passive prototype expected to be functionally simulated by the G_m-C filter. This synthesis method has been used for the implementation of various types of filters. By PSpice simulations the correctness of the design has been checked out.

"PARALLEL" DRIVING

Niculaie PALAGHITA, Dorin PETREUS, Cristian FARCAS, Alexandra BORCA

Abstract: This paper makes some remarks referring to the power bipolar junction transistor driving. The paper presents Philips strategy of power bipolar junction transistor driving and proposes another strategy most efficiently. The proposed strategy is called "parallel" driving. Parallel driving supposes two phases. In first moment, in base of power bipolar junction transistor is applied a small negative current, when the stored charges from structure of transistor are reduced by recombination. After 0,2-KJ_s, it is applied a strongly negative current to obtain a quickly fall time of collector current and decrease the dissipated power to turn off. Also, the power bipolar junction transistor works in profound saturation, where has a small signal dynamic resistance.

THE INVERTER INPUT CURRENT RIPPLES USING DELTA MODULATION

Niculaie PALAGHITA, Dorin PETREUS, Alexandra BORCA, Cristian FARCAS

Abstract: This paper presents an analysis of the brushless DC motor functioning using two points adjustment (delta modulation) current control. It's presented the study of the motor current conduction transfer process from one phase to other phase, and the experimental results of the study are given in this paper. From experimental results we draw some conclusions.

SPICE MODEL FOR QUASI-RESONANT CONVERTERS CONTROL CIRCUIT

Ovidiu POP, Gabriel CHINDRIS, Silviu PLESA

Abstract: The zero voltage or current switching is one of the modern power conversion techniques. Starting from the quasi-resonant converters control circuit UC 3861 data sheets, this paper present a method to design a SPICE model for this control circuit. Are also presented the models for each functional block of the control circuits and a close-loop simulation for a zero voltage switching quasi-resonant converter.

THE HYPERBOLIC APPROXIMATION OF SOME NONLINEAR MAGNETIZATION CHARACTERISTICS

Victor POPESCU, Ioana SARACUT

ABSTRACT: This paper presents the possibility of approximating of some nonlinear magnetization characteristics in weak fields. The modified hyperbolic approximation will allow the control of the characteristic's curvature without affecting the slope in origin nor the position of the asymptote. The proposed approximation can be utilized in realizing some PSpice models of nonlinear inductance.

PSPICE MODELS OF NONLINEAR INDUCTANCE AT LOW CURRENTS

Victor POPESCU, Ioana SARACUT

ABSTRACT: Modeling of weak electromagnetic waves propagation in ferromagnetic environments needs models of nonlinear inductance at low currents. Simulation programs offer only polynomial approximations of the magnetization characteristics. This paper presents models based on cubic and modified hyperbolic approximation. Comparative results are presented, from which results that the hyperbolic approximation based model is more flexible in adjusting the curvature of non-linear characteristic.

NON-PARAMETRIC CURVATURE ESTIMATION FOR GRAY SCALE IMAGES

Romulus TEREBES

Abstract: A digitised curve is viewed as a surface over the xy-plane. The level curves of this surface provide information about edge directions and feature locations. This paper presents a method for the extraction of tangent directions and curvatures of these level curves. The tangent direction is determined by performing a Principal Component Analysis. The curvature calculation is then performed, unlike most previous work, on non-parameterised curves; it works instead on the tangents across adjacent level curves. Examples of real images are given which show application of the proposed method in feature point detection

Number 2, 2001

NEW TECHNIQUE IN 3D MEDICAL CT IMAGES RENDERING USING OPEN GL OR DIRECTX TECHNOLOGIES

Nicolae CRISAN

Abstract: The most effective 3D technologies, as Open GL and DirectX, are already used in virtual reality with good results. VR world has gone up last years, so the VR method as Open GL and DirectX could be the best solution for future 3D medical applications. The paper presents a new method, which prepare data, in order to be suited for 3D rendering, using DirectX or OpenGL technologies. The presented method could be considered a complete solution including capturing, edge detection, data interpolation, error decreasing and data rendering.

INTERACTIVE INTERNET-INTRANET DOCUMENTS WITH IMAGE PROCESSING FACILITIES

Mircea-Florin VAIDA, Ovidiu BUZA

ABSTRACT: Image processing and WEB design are considered to develop medical image documents. We developed an integrated software application that allows image processing facilities with WEB set up documents considering HTML format. The process is interactive and automated and the resulted document can be accessed on a local Intranet or in Internet if the WEB document is located on a WEB Server. The domain of interest can be larger from medical application, to educational, marketing and industrial domain too.

INTELLIGENT ANTENNAS FOR FUTURE WIRELESS COMMUNICATIONS

Tudor PALADE

Abstract: The first part of this paper will present an overview of the impact of intelligent antennas for next generation radio including a review of major challenges for the realization of such wireless systems, followed by the key issues and the state of the art of marked potential and expected impact and an assessment of real world performance gains. The second part will be a description of intelligent antenna systems. This section emphasizes that the integration of basic antenna characteristics with fast, highly efficient signal processing solutions implemented in a Digital Signal Processor (DSP) provides a flexible system whose characteristics can respond to changes in the radio environment to provide efficient communications. The third part of this paper will address the RF aspects of intelligent antennas. Major factors relevant to radio frequency (RF) integrated circuit design will be discussed, including the main directions in the antenna modeling and CAD development, antenna technologies and microwave techniques. The fourth part will be dedicated to

practical applications of smart antennas to broadband wireless communications.

SOME CONSIDERATIONS REGARDING THE DIGITAL SYNTHESIS OF THE SINUSOIDAL SIGNALS EMPLOYING RECURRENCE RELATIONS AND TABLE LOOK-UP

Zsolt A. POLGAR, Vasile BOTA

Abstract: The paper discusses the performances provided by two methods of digital synthesis of the sine waves, the first employing the recurrence, specific to sine-waves and the second based on table reading. It presents the way the sinusoidal signals can be generated and the performances of these synthesis methods. Performances are evaluated by means of the root mean square error (rmse) and total harmonic distortion coefficient (THD). As for the THD coefficient, the paper proposes a more accurate computation method. The distortions induced by the digital-analog conversion of the synthesized signal are also considered.

INDUCTION HARDENING COMPUTER AIDED DESIGN

Petre G. POP*, Marius VLAD**

Abstract : Many attempts of induction hardening is possible to avoid by predicting the technological parameters which are necessary to obtain the desired depth of the hardened layer. This impose the precalculation of the temperature fields inside the induction heated piece, based on a mathematical model which must consider all the phenomena which really happen : the temperature dependence of the material characteristics, the great length of the piece with respect to that of the inductor, etc. We used an algorithm based on the numerical treatment of the differential equation of the unstationary thermic conduction, by means of the finite differences method. The software, realized in Delphi 3.0, based on this method determine the technological parameters for the induction machine, editing the technological card, used directly by the operator.

THE INFLUENCE OF NETWORK FACTORS ON PROCESS MONITORING

Pavel HOROVCAK

Abstract: The contribution deals with the process monitoring based on www technologies and research the influence of clients' number and network transfer rate on process monitoring quality. The process monitoring is realized by distributed application. Server part of application (written in Delphi) acquires actual measured data and through the socket communication channel sends them to the client. The client part of application is realized as applet (written in Java), which receives data from server and executes their processing. There are some factors influencing the quality of client-server communication on server and client side- as number of running tasks, exploitation of system resources, number of connected clients and network rate.

Number 1, 2002

NEW EVALUATION CRITERIA FOR EDGE DETECTION ALGORITHMS SELECTION

Nicolae CRISAN

Abstract: The most important in edge detection algorithms is a good evaluation of contour errors. Contour error depends on differences between original contour and detected one. Not a good definition of contour error and error formula is important but the contour reference definition. One very well known method is to apply one edge detector gradient, but these result contours can not be considered as reference, because of contour errors. In his article proposes one method, which offers this image reference without edge errors. An evaluation criterion and classification is shown for each well-known edge detection algorithm.

DRIVE CIRCUIT FOR INDUCTION MOTOR

Dorin PETREUS, Nicolae PALAGHITA Cristian FARCAS

Abstract: This paper presents a drive circuit for induction motor. The circuit is design to (have an IGBT inverter and is built around the 10 HEF 4752 from Philips. Theoretical and experimental results are presented. Circuit waveforms

and a complete scheme of a drive circuit for induction motor are given.

ON THE ERROR PERFORMANCES OF THE TRANSMISSION SYSTEMS EMPLOYING ERROR CORRECTING CODES AND PARTIAL RESPONSE FILTERING

Zsolt A. POLGAR, Gavril TODERAN

Abstract: One of the facilities provided by the Partial Response (PR) filtering is the insertion of some spectral zeros, where pilot signals, employed for the synchronization, can be transmitted. However, the systems employing PR filtering provide poorer signal/noise ratio performances. The paper analyses the employment of the high rate convolutional error correcting codes (CEC C) and of a combined CECC-PR soft-decoding method, in order to secure S/N ratio performances similar to the ones of the non-PR filtered systems, in about the same bandwidth.

PERIOD - DEADLINE SINGLE PAIR SELECTION METHOD IN REAL -TIME COMPLEX SYSTEMS

Liliana VORNICU

Abstract: In real time complex systems working on high-speed processors, it is very important for the designer to know the timing constraints actioning in the real time systems. Generally, these timing constraints have variable values (for example, periods and the deadlines, which are standard timing constraints) and the designer has to chose a suitable single pair period - deadline from the set of pairs. To do this, he must use an algorithm that offers a maximum utilization of the real time system. In the following, we will present a system utilization calculation method that permits the selection of a suitable pair.

ANALOG DESIGN: MULTIOBJECTIVE OPTIMIZATION METHOD BASED ON FUZZY LOGIC

Gabriel OLTEAN, Costin MIRON

Abstract: The paper presents a new method for optimizing the analog circuits design. The method performs a multiobjective optimization, the parameter modification taking into account the unfulfilment degrees of all the requirements. The method uses fuzzy sets to define fuzzy objectives and fuzzy systems to compute new parameter values. The solution of a multiobjective optimization is a set of Pareto optimal points. We can obtain the set of Pareto optimal points using the idea of population of solutions. We select as the final optimal solution the one with smallest mean of unfulfilment degrees of requirements (zero if possible). The strategy to compute new parameter values uses local gradient information and encapsulates human expert thinking: to improve a performance we modify mostly the parameter with more influence. This way every Pareto optimal point can be found with accuracy. After introducing our optimization method, we optimize the design of a common-emitter amplifier. As expected the results prove that the method is efficient. For different sets of requirements we found a set of Pareto optimal points and for the sets with non-conflicting requirements the final solution has the mean of unfulfilment degrees equal to zero.

SECURE CLIENT-SERVER CONNECTING PROTOCOL USING ARAKI-UEHARA-IMAMURA DIGITAL SIGNATURES

Valentin DEAC, Monica BORDA

Abstract: A cryptographic system for a secure Client-Server communication which uses symmetrical keys needs a connecting protocol which deals with important problems such as: the authentication of the two parts involved, the confidentiality, the key exchange etc. In this paper we propose a connecting protocol based on public key cryptography which tries to solve the above mentioned problems. A Certificate Authority which respects the ITU-T X.509 - Directory Authentication Service standard [5] is used for the public key certificates. For the digital signatures involved in the protocol we use the Araki-Uehara-Imamura method [1].

ANALYSIS METHOD OF LOG-DOMAIN CIRCUITS BASED ON BEHAVIOURAL F-F] MODELS

Mihaela CIRLUGEA, FAZAKAS Albert, Lelia FEȘTILA

Abstract: We propose a simple method to analyze some log-domain filters by using behavioral models based on inverse F-F⁻¹ functions, leased on intuitive symbols and models, the method is easily to be applied and understood and can also be used in the educational process.

DIGITAL WATERMARKING BASICS

Monica BORDA

Abstract: This paper presents a brief overview of a relatively new research area (the digital watermarking) with great implication in the copyright protection for digital multimedia technologies. This research direction, started two years ago, is one of the most important opened in the Research Center in Information Science and Signal Processing of TUC-N, guided by prof. dr. eng. Monica Borda. This work is sustained by contracts funded by the National Agency for Science, Technology and Innovation (ANSTI) and by the World Bank. Research agreements in this domain are done with Plymouth University (UK), the Kyushu Institute of Technology (Japan) and Northern Jiaotong University Beijing (China).

DIGITAL WATERMARKING USING HASH FUNCTIONS

Reka MAJOR, Valentin DEAC, Monica BORDA, Dr. Graham WADE, Cristian SERDEAN

Abstract: The digital watermarking is used to protect the intellectual property rights in the multimedia field, It consists of algorithms which embed in digital multimedia data such as video, image or audio, an invisible information related to its owner and its current users. In order to achieve a proper frequency spreading and to protect the watermarked data, a cryptographically secure pseudo-noise signal is needed. In this paper we propose a technique for generating a watermark signal which depends on the original data and resists at some intentional and unintentional attacks. In the generating process we use hash functions and the DES algorithm.

Number 2, 2002

AN APPROXIMATION OF SATURATION CHARACTERISTICS

Victor POPESCU

Abstract. Based on the modified hyperbolic approximation for nonlinear magnetization characteristics for low currents [9], this paper presents an extension of this approximation's application to the saturation characteristics. The approximation thus obtained has the same three qualities as the one used for low currents; (1) a single description for both linear and nonlinear portions of the characteristic, (2) independence of asymptote and curvature adjustment and (3) smoothness of the characteristic as well as of its slope. There are also some examples given in the paper. The characteristic's shape can be adjusted by four parameters; the parameter L controlling the slope in origin, the nonlinearity factor k, controlling the asymptotic slope, the breaking current (the abscissa of the asymptote and the slope in origin intersection point) and the nonlinearity factor k2 controlling the characteristic's curvature. The four parameters controlling the approximation can be easily determined for a given (experimental) nonlinear characteristic. The flexibility of the hyperbolic approximation allows it to match the given characteristic.

REPEATING SPACE TIME CODES FOR TURBO TRELIS CODED MODULATION

Osman N. UCAN, Onur OSMAN, Omer ERKAN

Abstract: In this paper, we introduce a new type of Space Time codes denoted as Repeating Space Time codes (RST). Antenna diversity and using of Space Time block codes are effective ways to combat multi-fading and improve the error propagation over Rician especially Rayleigh fading environments. To evaluate this new antenna diversity scheme, we use Turbo Trellis Coded Modulation (TTCM) and we also compare Repeating Space Time codes with Alamouti's Space Time codes. For whole of the simulation results, four iterations are made for different Rician environments as $K \sim \langle \rangle$, 10, 0 dB and also we use two bit streams and each one has 1024 bits as an input.

SOME EXPONENTIAL STRUCTURES USED IN LINEAR APPLICATIONS

Lelia FESTILA, Albert FAZAKAS, Mihaela CIRLUGEA

Abstract: We analysed in this paper some exponential cells in order to put into evidence their connection with other linear universal building blocks based on the same basic schematic (current conveyor CCII+, Diamond transistor, Diamond

current source, OTA). Some limits and requirements for the linear operation have been deduced. We also concluded that the sh cell is a general universal structure that can be used in both linear and nonlinear applications. Examples and simulations proved the validity of our analysis.

EVALUATION OF FAIR BANDWIDTH ALLOCATION POLICIES FOR ELASTIC TRAFFIC THROUGH A LINEAR PROGRAMMING MODEL

Ioannis D. MOSCHOLIOS, Michael D. LOGOTHETTS, George K. KOKKINAKIS

Abstract: Fair Bandwidth Allocation (FBA) for elastic traffic is based on the Max-Min Fairness policy (MMF), initially proposed for non-elastic traffic. We present a Linear Programming (LP) model, which describes the MMF policy and incorporates, in a parametric way, both weighted and un-weighted FBA policies for elastic traffic. We propose new FBA policies based on the MMF and considering either the number of connections or of Virtual Circuits (VCs) accommodated in a link, together with their traffic parameters. The number of links of a call-connection can be used as weight. Moreover, we evaluate the various FBA policies through the LP model and reach sound conclusions.

ORIENTATION DRIVEN DIFFUSION

Romulus TEREBES, Olivier LAVIALLE, Pierre BAYLOU, Monica BORDA

Abstract: In this paper we propose a new discrete version of the classical anisotropic diffusion filter. Our filter uses supplementary pattern orientation information, the diffusion process rest scalar. The efficacy of the proposed method is shown through application samples involving synthetic and ancient engravings real images. We address a recently mentioned undesired pinhole effect of the classical diffusion, and through experimental results we show that our method greatly reduces this effect.

WEB DESIGN FACILITIES FOR DISTANCE LEARNING PERSPECTIVE

Mircea-Florin VAIDA, Dinu CHIRA

Abstract: Considering the perspective learning with web facilities we developed a dedicated application for distance learning considering the PHP language. The application will emulate a virtual university and is compatible under Unix and Windows operating systems. Some multimedia documents are also considered in the learning process and will be also available with the chat facility implemented to improve the educational process. A comparison with other distance learning products is also made. Security elements are implemented with the SSL protocol.

ON THE APPROXIMATE DIGITAL GENERATION OF UNIFORM AND GAUSSIAN DISTRIBUTED NOISE SIGNALS

Vasile BOTA, Zsolt A. POLGAR

Abstract: The paper presents a digital method for generating the uniform and Gaussian distributed noise signals. The noise signals are approximated by means of a pseudo-random sequence (PRS) and an approximation step s . The paper analyzes the influences of the PRS length and s upon the accuracy of the Gaussian law observance, upon the amplitude range of the output signal and gives some brief considerations regarding the spectra of the generated signals. Some applications of the proposed method that were used by the authors in digital implementations are briefly described as well.

A MODULAR APPROACH TO STATE VARIABLE Gm-C FILTER DESIGN

Doris LUPEA, Gabor CSIKES

Abstract: This paper presents a generalized, modular approach to Gm-C filter design. The synthesis method is based on state variables. For a modular design of these filters some basic building blocs must be designed. These basic building blocs are based on impedance inversion implemented with gyrators. The proposed synthesis method can be used to design any type of filter for a given approximation. All the experimental circuits have been simulated using PSpice.

COMPARISON OF FEATURE PARAMETERS USED IN SPEAKER RECOGNITION

Pop G. Petre, Todorean Gavril

Abstract: Speaker identity is correlated with the physiological and behavioral characteristics of the speaker, both encoded in the spectral envelope and in the supra-segmental features (voice source characteristics and dynamic feature

spanning over several segments). Speaker recognition requires speaker characteristic features, independent of the particular spoken word if possible. Features based on short-term spectral estimate have a strong dependence on individual speakers and consequently are used in speaker recognition. In addition, pitch information is sometimes used if it can be estimated reliably. We study the influence of some features (LPC, LPC cepstrum, MFCC, delta- and delta-delta-) on speaker recognition using DTW and VQ methods.

CONCORDE: VOCATIONAL TRAINING THROUGH OPEN AND DISTANCE EDUCATION

Mircea GIURGIU, Lynn CONNAUGHTON, Luis LIZAMA, Manolis CHRISOSTALIS, Simona COSCIA, Dana BENEÄ, Daniel DON

Abstract: The paper presents intermediary results obtained in the frame of the EC funded Leonardo da Vinci pilot project with the title "Acquisition of Complementary Competencies through Open and Distance Education" (CONCORDE). The partnership is formed by seven institutions, three from Romania, with the aim to create a training network and develop training materials in the form of Open Distance Learning (ODL). In the first stage of the project a survey of training needs as complementary competencies was done by each partner and according to this, the partnership is in the phase of designing and development of ODL modules. These modules are going to be in the areas of: information technologies (basic and high level-telecommunications), Internet communication, injection moulding for plastic materials and business administration. Some of the intermediary results are disseminated in this communication.

OCTOPUS: AN APPROACH FOR A TRANSNATIONAL ON-LINE RESOURCE CENTRE

Vito CARIOCA, Rui GAIBINO, Antonio MEDINA, Tiberio F. MURIAS, Mircea GIURGIU, Joao C. CHOURICO, Luis SANTOS, George VAVIZOS

Abstract; This communication presents the main ideas behind the Socrates/Minerva project: "Transnational on-line resource centre" (OCTOPUS) dedicated to the development of a web resource centre in the specific field of environmental education, for this pilot phase. This resource centre will implement an innovative mechanism of information retrieval through a website which will allow the access of the users from different regions with common interests in the area of environmental education using modern electronic tools. The core of the resource centre is a very well organized database which is uploaded and searched using metadata descriptors. Apart of technical and scientific development, this site will offer open training activities which are the subject of this paper, too.

Number 1, 2003

CHANNEL CAPACITY DESIGN IN INTEGRATED SELF-HEALING NETWORKS

Michael LOGOTHETIS, Ioanis NIKOLAOU, George KOKKINAKIS

Abstract: Integrated self-healing networks combine more than one survivability techniques and can achieve higher network reliability and cost-effective design. We present three pure heuristics algorithms for the design of spare and working channel capacities of integrated self-healing networks. All algorithms are based on the shortest path principle. Algorithm 1 and 2, contrarily to algorithm 3 do not take into account possible restrictions in node capacities. In comparison to other shortest-path based algorithms they are more homogeneous, perform better and achieve considerable savings in total channel capacity of the backbone network. Algorithm 2 performs best under specific communication demand requirements, while algorithm 1 is not sensitive to the communication demands.

FUZZY IMAGE ENHANCEMENT USING THE LOGARITHMIC MODEL

Vasile Patrascu

Abstract: The logarithmic model of image representations supplies a great number of tools for analyzing and processing both the color images and gray level ones. Simple and efficient methods for image enhancement can be obtained through affine transforms, defined by the logarithmic operations: the addition and scalar multiplication. The parameters of an affine transform are determined taking into account the statistical features of the image. Most of the times, it is calculated a

single affine transform for the whole image, then the enhancement uses a point transform. One can get a surplus of quality if a partition is defined on the image support and, then, one determines an affine transform for each element of the partition. Using a classical partition may lead to appearance of some discontinuities when passing from one element of the partition to another one. The necessity of eliminating all these drawbacks guides us naturally to the utilization of the fuzzy partitions and from now on, to the calculus of the affine transforms' parameters in the context of the fuzzy sets theory. In this way, we come to calculate the fuzzy mean and the fuzzy variance within the logarithmic model.

A MODEL FOR ADAPTIVE HYPERMEDIA SYSTEMS

Rodica Baciu

Abstract: In this paper, we describe an abstract model of adaptive hypermedia systems through extended conceptual base of general hypermedia model. The major difference between unadaptive and adaptive hypermedia systems lies in the way nodes are traversed and the rules that govern such traversals. Whereas traversal in unadaptive systems is, generally, referential, traversal in adaptive system can also be contextual, i.e. the link to follow is determined by the user model. In proposal model we conceptualised additional facilities not available in the hypermedia model and necessary in modelling of adaptive hypermedia systems.

SOME ASPECTS REGARDING THE ERROR PERFORMANCES OF THE LDPC CODES DECODED WITH THE MESSAGE PASSING ALGORITHM

Vasile BOTA, Zsolt POLGAR

Abstract: The Message-Passing algorithm (MPA) is the algorithm employed for decoding the Low Density Parity Check (LDPC) codes. Basically, this algorithm decodes every bit of a codeword by using the Bayes criterion and uses the syndrome to check the decoded codeword. Due to its adaptive and probabilistic nature, this algorithm exhibits a particular behaviour, compared to other decoding algorithms. This paper analyzes three aspects regarding this algorithm: the non-convergence of the algorithm in terms of the LDPC code parameters, the influence of the LDPC code rate upon the bit-error performance and a comparison between the performances of the MPA and those of an ideal Maximum Likelihood (ML) decoding algorithm.

A NOVEL ENERGY RECOVERY SNUBBER

Niculaie PALAGHITA, Dan MICU. Cristian FARCAS, Dorin PETREUS

Abstract: In this paper, we propose a novel topology of energy recovery snubber. The proposed topology of energy recovery snubber is obtained by modifying the Williams' snubber. For this, we introduce a transformer to obtain a second path for energy recovery. The mathematical equations that describe turn-on and turn-off transitions are presented. The behavior of the Williams' snubber and the proposed energy recovery snubber was experimentally analyzed.

ON THE STUDY OF THE MOTION WITH DOPPLER SYSTEMS WITH ACTIVE FIXED REFERENTIAL

Dan POPA, Corneliu TOMA

Abstract: This paper includes a brief introduction to the bases of the study of motion in different environments with the aid of Doppler systems with electromagnetic and ultrasound waves. There are given limits up to which they can be used in an elastic environment of infinite dimensions. The paper sets the basis of the study of the motion with Doppler systems with active fixed referential, offering a solution for converging the Doppler shift in frequency and another solution for the structure of the electronic equipment used for such a system. It also presents the perspectives of using these systems in the field of scientific and technical development.

TESPAR ALPHABET GENERATION USING STANDARD VQ AND COHONEN NN

Petre POP, Eugen LUPU, Gavril TODEREAN

Abstract. TESPAP (Time Encoding Signal Processing and Recognition) is a processing and recognition method in the time domain, proposed by [1]. The key problem in TESPAP is to define the alphabet used for the coding process, generated by a quantization process. This paper presents two ways for TESPAP alphabet generation, standard VQ and Kohonen neural networks.

APPLICATION WITH ATMEL AVR RISC MICROCONTROLLERS

Radu Balan, Alin Gliga

Abstract: This paper presents a few applications of ATMEL AVR RISC microcontrollers in mechatronics. This family of microcontrollers can be used to control different types of actuators (DC motors, AC motors, stepper motors, shape memory alloy SMA, etc.), different processes, automotive instrumentation, onboard computers, security with code lock or guarding perimeter / entrances with IR on LASER beams, wireless devices. The programming software is very easy to use even for non-specialists. Different types of software can be used to develop applications: assembly or high level programming languages such as C or Basic.

CLOSED-LOOP IDENTIFICATION IN ADAPTIVE CONTROL: SIMULATIONS AND EXPERIMENTS

Radu BALAN, Alin GLIGA

Abstract: This paper describes a few examples of closed loop identification in the case of implementing of a model based predictive control which uses an line simulations and rule based control. The most important step in adaptive control is the model update (identification of the model parameters). The degree to which the model is able to represent the process and automatically adjust to the process changes, determines the accuracy of the calculated control action and the resulting control performance. A Delphi application is used both for, simulations and experiments. To connect to the process it is used a system with 80C552 microcontroller.

MODULAR DESIGN OF GIN-C STATE VARIABLE FILTERS FOR APPROXIMATIONS WITH ARBITRARY TRANSMISSION ZEROS

Doris LUPEA, Gabor CSIPKES

Abstract: This paper presents a generalized, modular approach to Gm-C filter design for approximations with arbitrary transmission zeros. The synthesis method is based on. state variables. For a modular design a transconductance amplifier based structure is defined, which is the same for all filter types and for all approximations. The desired transfer function can be realized by some building blocks based on impedance inversion implemented with gyrators. These blocks can be derived from the passive prototype of the filter. All the experimental circuits have been simulated using Pspice.

Number 2, 2003

REPEATING SPACE TIME CODES FOR TURBO TRELIS; CODED MODULATION

Osman N. UCAN, Onur OSMAN, Omer ERKAN

Abstract: In this paper, we introduce a new type of Space Time codes denoted as Repeating Space Time codes (RST). Antenna diversity and using Space Time block codes are effective ways to combat multi-fading and improve the error propagation over Rician especially Rayleigh fading environments. To evaluate this new antenna diversity scheme, we use Turbo Trellis Coded Modulation (TTCM) and we also compare Repeating Space Time codes with Alamouti's Space Time codes. For whole of the simulation results, four iterations are used for different Rician environments as $K=8, 10, 0$ dB and also we use two bit streams and each one has 1024 bits as input.

SECURITY ISSUES REGARDING WEB DISTRIBUTED APPLICATIONS

Cosmin STRILETCHI, Mircea VAIDA

Abstract: The aim of the paper is to present the security elements involved in web applications. E-commerce applicataans and data access such as university's information database may be protected using different security techniques. Considering an e-commerce application, we developed some security elements that will provide an accurate and safe data transfer mechanism. We adapted the application for allowing our university's students to access their exam results and to view their overall situation or some private data using web facilities.

TRAFFIC CONTROL MECHANISMS IN LARGE-SCALE IP NETWORKS

Evi Tsolakou, Anastasios Doulamis and Nikolaos Doulamis

Abstract: The DiffServ architecture has been proposed as a scalable solution for providing service differentiation among flows. Towards the enhancement of this architecture a new set of network services are proposed in this paper. Each network

service is appropriate for a specific type of traffic and is realized through its own network mechanisms, which are the Traffic Classes. Traffic Classes are composed of a set of admission control rules, a set of traffic conditioning rules and a per-hop behavior (PHB). A large-scale network is considered as the reference topology for studying the performance and effectiveness of the proposed network services with the use of the OPNET simulation tool.

ADAPTIVE INTERPOLATION BETWEEN BIOMEDICAL SLICES, USING INTER-CORRELATION BETWEEN VOXELS

Nicolae Crisan

Abstract: Medical slices, such as CT or MRI, are used for 3D reconstruction of human organs like kidney and bones. The anisotropy along z-axis is the reason, for the medical interpolation between 2D sections. This article, it is not focused on a new interpolation techniques used to diminish the z-axis anisotropy, but an adaptive interpolation method, taken into account in order to optimized the performance of the interpolation. No matter what algorithm of interpolation is performed on a medical image, the idea presented in this article is to find the best direction throughout the 3D medical scene along the interpolation will be done, taking into account the maximum voxels inter-correlation.

AUTOMATIC REMOVAL OF NOISY DATA FROM DATA SETS. APPLICATION IN CIRCUIT FUNCTIONS MODELING

Gabriel OLTEAN, Mihai CRASI

Abstract: The problem to build a model of an unknown complex function from data sets is a fundamental issue in a variety of scientific and engineering fields. Even in the case of a large amount of data, there can be some situations for that same representative features of the function are altered due to the noisy measurement. In order to obtain an accurate model we have developed and implemented a method to automatically find and eliminate the data points affected by noise. The interaction between the user and the computer program is facilitated by a friendly graphical user interface. We validated the method by using it to model two bi-dimensional mathematical function: a linear one and a nonlinear one. As an application of the method we use it to model a circuit function for a simple operational transconductance amplifier..

GRAY LEVEL IMAGE ENHANCEMENT METHOD USING THE LOGARITHMIC MODEL

Vasile PATRASCU

Abstract: This paper presents a method for image enhancement using affine transforms within the logarithmic model. The parameters calculus of the affine transform was made after a short analysis of the well-known image enhancement method based on the histogram equalization.

HIGH FREQUENCY, NARROW BANDWIDTH BAND-PASS FILTER SYNTHESIS BASED ON Gm-C BIQUADS USING Q-ENHANCEMENT

Gabor CSIPKES, Doris LUPEA

Abstract: This paper presents a new approach to high frequency, narrow bandwidth band-pass filter design. The proposed method has been developed starting from the classical synthesis method with biquads and can be used to design filters for new mobile transceiver architectures.

NITRIDE AND POLYSILICON ETCHING IN PARALLEL PLATE PLASMA

Florin BABARADA, Cornelia DUNARE, Marcel PROFIRESCU, Claudiu AMZA, Eugen LAKATOS

Abstract: Nitride and Polysilicon are usually layers for microelectronic fabrication technology. Dry etching of nitride and polysilicon films is very important for integrated circuits fabrication and now also for Microelectromechanicals Systems (MEMS) [1]. The increase of the etching uniformity is very strong required by MEMS because the dimensional configuration and precision of mechanical structures has a direct influence on the mechanical properties. It was found that the uniformity could be improved by decreasing the power and pressure or by increasing the flow rate.

DEVELOPING A CONTROL SYSTEM FOR AN ELEVATOR USING XC 4000XL FAMILY OF XILINX FPGA
Sorin Hintea, Albert Fazakas, Mihaela Cirlugea

Abstract: This paper describes a design procedure of a two chamber elevator control system using FPGA circuits. The control system memorizes and controls calls received regarding the current speed and actual position of the chambers, sensor's operation, damage and alarm, and possibilities of technical support to the supervisor in the hot points of the system function. The modular structure of the design and software solutions of the XILINX FOUNDATION package allow changes in controller functions with small corrections in hardware.

MUSICAL INSTRUMENT CLASS IDENTIFICATION USING CEPSTRAL COEFFICIENTS DERIVED FROM A CONSTANT Q TRANSFORM

Annamaria MESAROS, Eugen LUPU

Abstract: Musical signals analysis and synthesis has found its place within digital signal processing in the last decades. A method of musical instrument class identification by analyzing the musical signal is presented in this paper. The instrument class model is based on the cepstral coefficients derived from the coefficients of a constant Q transform. Usually in speech/speaker recognition applications, the cepstral coefficients proved to be a robust set of features. Based on the cepstral coefficients values, more identification methods were developed: one employs a calculation of a distance measure and two implementations based on neural networks. The results are satisfactory, especially in case of neural networks.

AVERAGED MODELING OF CONVERTERS OPERATING IN CONTINUOUS AND DISCONTINUOUS CONDUCTION MOD - REDUCED ORDER MODEL

URSARU OVIDIU, DIORDIEV ALEXANDRU, AGHION CRISTIAN, TIGAERU LIVIU

Abstract: The difference between the converters de-dc, which operate in continuous and discontinuous modes is that the latter has three functioning stages for a cycle of switching - switch ON, switch OFF and stage of zero current. Moreover, there are new restrictions to the functioning of the circuit, namely the momentary value of the current through the inductance where the energy accumulated begins to grow above zero at the beginning of the commutation cycle and reaches zero before the commutation cycle ends.

OPERATIONAL TRANSCONDUCTANCE AMPLIFIER FOR FILTERING IN HIGH FREQUENCY IF SAMPLING RECEIVERS

Gabor CSIPKES, Doris CSIPKES

Abstract: This paper presents an operational transconductance amplifier that is suitable for high frequency band-pass filters design. The improvement is done using a voltage mode-current mode combined approach that allows an extension of the variation range far the transconductance parameters compared to classical OTA-s while a relatively low consumption is maintained. The OTA structure is based on a combination between two classical circuits: a second generation current conveyor and the cascode output stage.

AN EXTERNAL SOFTWARE FOR CONTROLLING THE PSPICE SIMULATOR

Liviu NEDELEA, Albert FAZAKAS, Lelia FESTILA

Abstract: This paper presents a method to externally control the PSpice simulator 8.x - 9.x. implemented in a software application running on windows platforms. It also contains a working demonstration an an analog low pass Elliptic filter. The obtained data are processed on an external spreadsheet calculation in Microsoft Excel.

IMAGE REJECT RECEIVER ARCHITECTURES FOR. WIRELESS COMMUNICATIONS - PERFORMANCE ANALYSIS
Doris CSIPKES, Gabor CSIPKES

Abstract: This paper presents a detailed analysis of some image reject architectures that are frequently employed in mobile communication receivers. The behaviour of the described architectures is characterized using the parameter called Image Rejection Ratio (IRR). The spectrum of the wanted and unwanted signal components in different intermediate nodes of the chain is also presented. The calculations have been verified using Matlab.

THE INFLUENCE OF FEATURES COEFFICIENTS SEQUENCES IN SPEAKER RECOGNITION

Petre G. POP, Eugen LUPU

Abstract: Speaker recognition requires speaker characteristic features, independent of the particular spoken word if possible. Features based on short-term spectral estimate exhibits a strong dependence on individual speakers and consequently are frequently used in speaker recognition. However, these features also contain information about the lexical content of the utterance. In this paper we present the results of a study about the influence of eliminating individual or sequences of coefficients from speech features (LPC cepstrum, MFCC) on speaker recognition using VQ.

PERFORMANCE ANALYSIS OF THE WCDMA DOWNLINK CHANNEL

Martin SZEKELY, Tudor PALADE, Emanuel PUSCHITA

Abstract: The paper presents the experimental evaluation of the WCDMA downlink channel. With that end in view, it was built a simulator to investigate the performances of DPCH (Downlink Physical Channel). In the first part of the paper, we have a brief description of the simulator and the parameters involved. The second part of the paper is dedicated to performance analysis: BER vs. EbNO and BER vs. Number of Users.

LOW-COMPLEXITY SYSTEM FOR SPEAKER RECOGNITION

Eugen LUPU, Petre G. POP, Ervin KRAINICS

Abstract. The speaker recognition has many applications in telecommunications, "on-site" and forensic fields. The usual approaches require important computational resources generally necessitating complex signal processing in the frequency domain. This work proposes a low-complexity implementation of TESPAC coding method, on an ATMEL microcontroller system. The computational requirements for this method are two orders of magnitude less than that required by other usual methods.

DIELECTRIC PROPERTIES ANALYSIS OF A NEMATIC LIQUID CRYSTAL AT MICROWAVE FREQUENCIES

Daniela Ionescu, Nicolae Dumitru Alexandru

A nematic liquid crystal was tested in order to be used for electronic displays. A study was carried out using microwave simulations methods, in frequency range 1-10GHz, using specific simulation program, HFSS (Ansoft Technologies). The aim of this paper is to find the crystal birefringence, using testing methods in electric fields orientated parallel or transverse to the nematic unit vector of the crystal.

IMPLEMENTATION OF A MEDICAL MULTIMEDIA DATABASE CONSIDERING ORACLE AND J2EE PLATFORM

Mircea-Florin VAIDA, Jozsef DOMOKOS

Abstract: Oracle9i Application Server is a scalable, secure, middle-tier application server. It enables delivering Web content; host Web applications, connected to back-office applications, and access data on wireless devices. Using Oracle9i facilities we developed a dedicated application for medical image and multimedia content storage and retrieval considering the J2EE platform and the Oracle9i Database Server and Application Server. The application stores multimedia content such as images, audio and video data, in an Oracle9i database and the access to the content is guaranteed by an Oracle9i server application. The clients logs into system from a LAN (or Internet) having different types of security roles on the content. The application interface is presented to its users through a Web site or a file transfer client and a customer interacts with the application using a Web browser or a client application for file transfer. The application will allow information querying and searching, user management and maintenance.

ON USING SIMULATED DATA FOR SPEECH RECOGNITION OVER TELEPHONE CHANNELS

Dragos BURILEANU, Cristian NEGRESCU, Victor CROITORU, Mihai SIMA

Abstract: Robust speech recognition is nowadays an active investigation field for the speech research community: Increasing the accuracy of speech recognition over telephone lines has become a necessity, as there is a clear increasing demand for more spoken language processing applications involving telephone speech. This paper advocates the use of simulated data during the development of robust speech recognition systems and presents a rigorous method to model and simulate a real telephone channel. Experiments using simulated telephone data for a speaker-independent isolated-spoken word recognition system are described. System's

recognition performance in different training and testing conditions are also discussed.

SOME ASPECTS OF TESTING PROCESS FOR TRANSPORT STREAMS IN DIGITAL VIDEO BROADCASTING
Radu ARSINTE, Ciprian ILIOAEI

Abstract: This paper presents some aspects related to the DVB (Digital Video Broadcasting) investigation. The basic aspects of DVB are presented, with an emphasis on DVB-T version of standard. The main purpose of this research is to analyze the way that the transmission of the transport streams is realized in case of the Terrestrial Digital Video Broadcasting (DVB-T). To accomplish this, first, Digital Video Broadcasting standard is presented, and then the main aspects of DVB testing and analysis of the transport streams are investigated. The paper presents also the results obtained using two programs designed for DVB analysis: Mosalina and TSA.

DISTRIBUTED IMAGE PROCESSING APPLICATION CONSIDERING CORBA AND XML TECHNOLOGY
Silviu Titus MOLDOVAN, Mircea-Florin VAIDA, Gavrilă TODEREAN

Abstract: This paper will present a distributed image processing application that has the objective to create an efficient and powerful instrument for image analysis in varied domains like medical applications, industrial applications and others. For the implementation we have used the CORBA technology and as programming language we have used C++ and Python. The information (texts, images, sounds) is stored in XML files.

TRAINING MATERIALS AND THE PEDAGOGICAL MODEL IMPLEMENTED ON THE "CONCORDE" WEB PLATFORM FOR OPEN AND DISTANCE EDUCATION

Mircea GIURGIU, Nikos BOGONIKOLOS, Luis LIZAMA

Abstract: The paper presents some of the final results obtained in the frame of the EC funded Leonardo da Vinci pilot project with the title "Acquisition of Complementary Competencies through Open and Distance Education" (CONCORDE) and it complements other dissemination papers. Mainly, we focus here on the technical implementation of an innovative pedagogical model, based on spiral evolution and on the final training materials available on the web site, CD or printed form. These materials respond to the training needs identified in the first stage of the project and they are aimed for competence development through Open and Distance Education, particularly web-based training, in the following areas: information technologies at basic level, Internet programming, plastic materials and business administration. A web platform developed at Technical University of Cluj supports on-line training material organisation via web interfaces and open access to training resources through personalized interfaces. Evaluation tools, additional training resources and communication facilities, such as forum, are an integral part of this electronic platform. Some of these final results are outlined and disseminated in this communication.

ON-LINE RESOURCES AND TRAINING MATERIALS IN ALFA VERSION OF OCTOPUS PROJECT

Mircea GIURGIU, Vito CARIOCA

Abstract: This informative article aims to present the current stage of the Socrates/Minerva project: "Transnational on-line resource centre" (OCTOPUS) dedicated to the development of a web resource centre in the specific field of environmental education and to introduce the new activities that will take place in the near future. After a one year of activity, an evaluation instrument of the alfa version of the web prototype has been developed and applied at the end of year 2002 in order to investigate and to conceptualise technical and pedagogical requirements for the next phase dedicated to the implementation of the beta version. The heuristic evaluation model and the epistemological assertions of the method are briefly presented. Technologically, some relevant implementation issues will be demonstrated in this paper. With these, requirements for the beta version have been established and they are under development in order to allow expert evaluation for the mid year 2003. Meanwhile, resources uploading is a continuous process and the designing of self learning materials has passed the conceptualisation phase.

FORECASTING ANN MODELS BASED ON TIME SERIES ANALYSIS USING NON-UNIFORM DISTRIBUTION OF TRAINING SAMPLE NUMBER

Denis E. ARTEMKIN

Abstract: This article presents some ways which allow to raise efficiency of forecasting artificial neural networks (ANN) functioning. These ways are based on exponential and so-called adaptive distributions of training sample number. The article illustrates with a practical example that using proposed ways allows to raise ANN efficiency expressed as less mean square error of forecast and greater number of correctly predicted time series values, in comparison with both classical methods of ANN training and methods of math statistics, such as auto-regression model in the given example.

IMPLEMENTING THE DISCRETE COSINE TRANSFORM AS A NEW COMPONENT OF IMAQ VISION LIBRARY **Bogdan ORZA, Mircea GIVAN, A. VLAICU**

Abstract: IMAQ Vision is a library of functions used to implement digital image processing applications in LabView. The paper presents a modality of implementing new image processing algorithms that are not included in the basic package of IMAQ Vision. Taking into account that the image compression field is less represented and developed within IMAQ, the implementation of the discrete cosine transform - one of the most used transforms in the image compression - was considered useful.

IMPLEMENTING A MEDIA RELAY SCHEME FOR REAL TIME STREAMING AT THE APPLICATION LAYER. **Ch. Z. Patrikakis, N. Minogiannis, Y. Despotopoulos, P. Fafali**

Abstract: In this paper, the description of an open architecture for supporting real time media streaming is presented. The architecture is based on media relay nodes that can be deployed transparently to any existing media distribution scheme, which can support any type of media streamed using the RTP and RTSP protocols. The architecture is based on overlay networks and is deployed at the application level. In parallel, a prototype of the relay node that has been developed and deployed in desktop PC, laptop and PDA is presented, together with performance tests that have been conducted.

TREE CONTENT BASED SEARCH ALGORITHM FOR AN IMAGE DATABASES **M. MOCOFAN, C. CALEANU, V. MARANESCU**

Abstract: For the indexing of an image data bases can be used many features. In this paper are used features like histograms for the colour components, stochastic moments, few parameters of the co-occurrences matrix and the Gabor filters decomposition. Using all of them we obtain good performance in the field of content-based image indexing and retrieval. There are some speed problems because are many features used in the search process. Here, I present an algorithm for indexing and retrieval, which use a tree algorithm for speed increasing. The area of applications is very wide: multimedia documents, transaction systems, medical application, query and browsing.

A NEW METHOD FOR ESTABLISHING THE TRANSFER FUNCTION OF OPTIMUM FILTERS **Valeriu MUNTEANU, Daniela TARNICERIU**

Abstract: A new method to compute the transfer function for an optimum filter, both for discrete and continuous domain, is proposed. The optimum filter characterized by the transfer function obtained based on the proposed method assures the minimum mean square error and its performances are the same as those of filters derived on the base of classical methods developed by Wiener and Kalman.

MAXIMUM RANGE PLANNING FOR 2.4 GHZ WLAN NETWORKS **Nicolae CRISAN**

Abstract: The wireless networks have had a huge impact over the communications data systems in the beginning of 2000's. Due to this fact it is more and more important to look closely, the radio planning approach, in order to take maximum advantages over the radio channels and the terrain. The article is focused on a very well known technique, which shows the way in planning radio links, using a simplified mathematical method. This method is based on the measurements we made in our laboratory, using a radio system consist of one radio access point and more mobile clients, working on Cluj-Napoca city.

IMAGE ENHANCEMENT METHODS USING HIGH ORDER STATISTICS

Vasile PATRASCU

Abstract: This paper presents an image enhancement method that uses piecewise linear transforms. The determination of this transform is done using a new measure for the mean dynamic range. Firstly the method is defined for monochrome images and secondly is extended for the color ones. Also it is presented the way for using of this method in the context created by the image support fuzzification. Using of the support fuzzification leads to the mean dynamic range calculus for fuzzy sets.

BENCHMARKING FEEDFORWARD NEURAL NETWORKS TRAINING ALGORITHMS

Catalin-Daniel CALEANU, Mugur MOCOFAN, Valentin MARANESCU

Abstract: The aim of this paper is to provide some guidance in choosing among different types of feedforward neural networks training algorithms. More specifically, experimental results are presented, using gradient descent, conjugate gradient, Newton and quasi-Newton training type methods, when neural network topology is varied as the total number of weights and biases is ranging from $N \times 10$ to $N \times 106$.

Number 1, 2005

A STATISTICAL APPROACH FOR EFFICIENT WEB DATA MINING

Nikolaos PAPADAKIS, Dimitrios SKOUTAS, Konstantinos RAFTOPOULOS, Theodora VARVARIGOU

Abstract: We present a fully automated system (wrapper) for extracting information from semistructured web pages. The emerging need for such systems occurs due to the need for going beyond the concept of "human browsing" by automating the process of information retrieval enabling further utilization by targeted applications. The key idea in our novel system is to exploit the format of the information contained in the web pages discovering the underlying structure and finally map it to semantic relationships. In doing this we identify one section of the web page as the one containing the useful information and we proceed in extracting semantic tokens contained in this section by using clustering techniques and other tools of statistical origin. Our innovation consists in building a system that can operate without human intervention or training and yet achieving excellent extraction precision and recall.

MULTIMEDIA PRESENTATIONS GENERATOR FOR STREAMING AUDIO-VIDEO CONTENT OVER INTERNET

Ovidiu BUZA, Kalman PUSZTAI, Mircea VAIDA

Abstract: A new technique has been developed in the last decade in the field of multimedia producing. It involves data streaming technology that is capable to provide audio-video high rate encoding and real-time deploying of multimedia content over a network. In this paper we present main concepts of data streaming and also the VPG application we have developed. VPG application is a graphical interactive platform that allows development of data streaming multimedia presentations that can be watched live through Internet. The difference between VPG and other international products of this category consists of modularity and efficiency in using multiple interactive capabilities.

CORNER FREQUENCY PROGRAMMING STRATEGY FOR LOW PASS FILTERS IN SOFTWARE DEFINED RADIO

RUS Cristian Matei, HINTEA Sorin

Abstract: A new method to change the corner frequency of a low pass filter is proposed. Traditionally, arrays of resistors and capacitors are used to select the desired frequency; the proposed method deals with the concept of "virtual scaling" a capacitor to achieve the change of the corner frequency. Thus, the need for resistor and capacitor arrays is eliminated and the IC size of the filter is minimized.

BEHAVIOURAL BLOCKS FOR A MORE PRECISE CALCULUS OF PSPICE FUNCTIONS

Mihaela CARLUGEA

Abstract: I created some specialized behavioral blocks that compute fast and accurately the power, the rms and average values of a signal. These values can be obtained in regular simulations with functions using specific PSpice techniques (products, filters)

and thus the results have significant errors or a long simulation time. This measuring method overcomes this problem. The signals can be seen through an adjustable "examination window". This offer a better precision than the one using the PSpice method. In the paper there are examples that prove this.

**APPROXIMATION OF THE FREQUENCY CHARACTERISTIC OF STANDARDIZED
VOCAL TELEPHONE CHANNEL USING DIGITAL FILTERS WITH FINITE IMPULSE
RESPONSE**

Zsolt Alfred POLGAR, Vasile BOTA, Mihaly VARGA

Abstract: The implementation of a vocal telephone channel simulator demands, among other processing, the simulation of the frequency characteristics of standardized telephone channels. A possible approach is the employment of digital filters with finite impulse response (FIR - filters), which must have imposed amplitude and phase characteristics. The paper shows that the direct approach to the design of these filters can't be used and proposes an algorithm based on the method of vector space projections (MVSP), by applying this method to imposed characteristics defined in a finite number of points. This algorithm ensures very good results for all the telephone channels standardized by ITU- T V.56 Recommendation.

RICH CLIENT CONCEPT IN INTERACTIVE LEARNING

Aurel VLAICU, Cosmin PORUMB, Sanda PORUMB

Abstract: This article consists of a set of methodologies used for designing interactive learning solutions. The approach is dedicated not only to the development process but it proposes an open architecture, Client-Side Manager for Interactive Learning, and an entire API, CSMIL API, that can be extended within the development process. It also highlights an interesting strategy to Integrate the rich client concept with the multimedia servers for improving the educational capabilities and transforming a classic eLearning platform in a powerful interactive learning system. CSMIL architecture provides an innovative presentation of data in a multimedia format, 2D graphics and speech-based user interaction capabilities are described during the article.

GENOMIC SIGNAL PROCESSING (I)

Petre G. POP, Victor I. POP, Eugen LUPU

Abstract: The purpose of this paper is to present the biological background used in genomic signal processing, then to survey some of these techniques and how they are currently being applied in the rapidly expanding area of genomic signal processing.

BROADBAND SERVICES FOR EVERYONE OVER FIXED WIRELESS ACCESS NETWORKS

Tudor Palade, Nicolae CRISAN, Emanuel Puschita, Ligia CHIRA

Abstract: Availability of broadband access to everybody has become a high priority nowadays and the 3G or the upcoming 4G growth comes to approve this assumption. Necessity to develop the information society expressed in documents like e-Europe plan it is already a European Union political goal.

Number 2, 2005

ADAPTIVE RADIO TECHNIQUES AT 5 GHz

Ligia CHIRA, Tudor PALADE

Abstract: This paper discusses the necessity and advantages of using adaptive radio techniques in Current 5 GHz wireless communication systems. Specific propagation issues are addressed here and an overview of adaptive techniques is presented with a focus on multiple-antenna systems. Most recent and near future wireless standards are presented from a comparative perspective when analyzing when and where adaptive systems should be used. The paper presents the results, interpretations, and conclusions of our 5GHz channel simulations on an 802.11 a PHY scheme.

GENOMIC SIGNAL PROCESSING (II). FOURIER ANALYSIS, A SHORT REVIEW

Petre G. POP, Eugen LUPU

Abstract: The first part of this paper presented biological background and some of signal processing techniques and how they are currently being applied in the rapidly expanding area of genomic signal processing. This second part focuses on spectral analysis of biological

signals. We considered the indicator sequence approach, digital filters used for exon prediction and DNA spectrograms.

IMPLEMENTING A TEST STRATEGY FOR AN ADVANCED VIDEO ACQUISITION AND PROCESSING ARCHITECTURE

Radu ARSINTE

Abstract: This paper presents some aspects related to test process of an advanced, non-standard architecture, video board, used in the IP surveillance system. The system is based on a Pentium compatible architecture using the industrial standard PCI04+. First the overall architecture of the system is presented, involving both hardware or software aspects. The acquisition board that is developed in a special, nonstandard architecture is also briefly presented. The main purpose of this research was to set a coherent set of procedures in order to test all the aspects of the video acquisition board. To accomplish this, it was necessary to set-up a procedure in two steps: stand alone video board test (functional test) and an in-system test procedure verifying the compatibility with both OS: Linux and Windows. The paper presents also results obtained using this procedure.

ADJUSTABLE FROM ZERO VOLTAGE REGULATOR USING ONLY ONE 723 INTEGRATED CIRCUIT

Gabriel OLTEAN, Emilia SIPOS

Abstract: A new circuit configuration to build an adjustable from zero voltage regulator with 723IC is proposed. Our circuit has the advantage of using only one 723IC (not two as for existing solution). Also then is not necessary to use an auxiliary negative voltage source. The final circuit configuration is deduced in three steps. We start from an initial configuration and using SPICE simulation we improved the circuit to the final configuration. The resulting output voltage is adjustable in the range [0V; VREF]. In order to check and validate our circuit we compare its regulation performances (line and load regulation and temperature coefficient) with the regulation performances of the existing solution with two 723ICs.

REVERBERATION ALGORITHMS

Norbert TOMA, Marina Dana TOPA, Erwin SZOPOS

Abstract: Artificial reverberation is used in different domains from cinematography to psychology for enhancement of room's acoustical properties. The paper starts with the presentation of the reverberation phenomenon followed by a description of some early and late reverberation algorithms. We describe the structure of some classical reverberation algorithms, where no frequency dependence for the reverberation time can be defined and no precise rules for design can be set up. Then some improved reverberators as well as their design and performance are presented. Several reverberation algorithms can be found in the literature, but very few design hints are given. Our paper includes a detailed design of the improved reverberators. The simulations, which were carried out, prove the better quality of the designed reverberators.

REPRESENTATION AND COMPARISON OF BJT AC PARAMETERS USING PSPICE

Albert A. FAZAKAS

Abstract: Bipolar junction transistor AC parameter representation can be simply obtained from the OrCAD Model editor, Parts. However, the represented characteristics do not offer data navigation, nor a possibility to compare two different BJT models. In this paper, alternative BJT AC parameter representation methods, using OrCAD Pspice, are presented. The parameter representations allow both data navigation and parameter representation of more than one model on the same graphic, easing up model comparisons. A method for measuring and representing collector-current dependent transistor parameters such as the forward DC beta, or the transit frequency f_T at a specific collector current, is also shown. Starting from the f_T versus the collector current characteristics of a transistor model, an application example that concerns voltage buffer speed optimization versus the bias current is also presented.

A VISION-BASED FUZZY EXPERT SYSTEM FOR THE SURVEILLANCE AND DIAGNOSIS OF HYDRODAMS USING UNDERWATER COLOR IMAGE ANALYSIS

Mihaela GORDAN, Costin MIRON, Ioan STOIAN, Odysseas TSATOS, Apostolos GEORGAKIS, Ovidiu DANCEA

Abstract: Surveillance of hydro plants represents a serious environmental problem. Limited access to upstream areas of hydro-dams makes their visual inspection difficult. However few attempts to build computer vision systems for upstream dam walls monitoring and diagnosis are currently reported; this artificial vision application area is on its

beginning. In this paper we propose a novel solution towards the automation of underwater hydro-dams monitoring and diagnosis, based on the visual examination of color underwater images of the upstream dam walls acquired with the use of an underwater robot vehicle. Whereas the traditional methods require the human expert to visually examine the underwater images (8 time-consuming and tiring task), the solution presented here reduces significantly the need for 8 human expert examination. This goal has been achieved by developing an image analysis subsystem specific to underwater dam wall examination, designing a fuzzy expert subsystem for the upstream dam wall diagnosis and combining the two subsystems into a complete vision-based fuzzy expert system for a specific diagnosis task of the dam walls.

A SYSTEMATIC DESIGN OF LOG-DOMAIN FILTERS

Lelia FESTILA, R. GROZA, M. CARLUGEA, A. FAZAKAS

Abstract: A systematic and general design method for exponentially state - space filters is presented. We focus in this paper on applications in log - domain, by simulating RLC ladder prototypes. After describing the RLC prototype by a block diagram or a signal flow-graph, the method can be applied directly without other intermediate operators as other modular design methods use [2, 3, 4, 7]. The examples include not only first order nonlinear basic building blocks (integrators, lossy integrators) but also second order nonlinear cells (BPF, high Q BPF).

MILLIMETRE RADIOWAVE RAIN FADE SLOPE AND FADE DURATION STATISTICS

Mihai V. BUD, Tudor P. PALADE

Abstract: The ITALSAT propagation experiment started in 1991, allowed an extensive program of measurements at 18.7, 39.6 and 48.5 GHz. This paper reports some statistical results of the second order millimeter radiowave rain fade slope and fade duration parameters. These parameters, are necessary in order to develop propagation impairment mitigation techniques. Statistics of second order parameters, fade slope and fade duration, are presented. The measurements available were carried out at Spino d'Adda, in the northern Italy, for a period of 7 years (from 1993 to 2000).

Number 1, 2006

A SOFTWARE APPROACH TO THE SECURED DISTRIBUTION OF MULTIMEDIA DATA (VIDEO ON DEMAND)

Cosmin STRILETCHI

Abstract: The aim of the paper is to present the security elements involved in the distribution process of multimedia content over the Internet. The software application implements a secured solution for a Video on Demand system destined for on-line watching and for home distribution of video data. The multimedia content for on-line watching is displayed at the client side using web pages embedded ActiveX objects that encapsulate the Windows Media Player and the Real Player movie controllers. The data meant for downloading is encoded and contains additional information about the expiration date. A downloaded video material can be viewed at home for a specified amount of time using a dedicated movie player offered online, capable of displaying the encoded data.

A NEW CONTROL AND HARMONICS ELIMINATION METHODS FOR A STATIC VAR COMPENSATOR USING A THREE LEVEL (N.P.C) INVERTER

Mustapha BENGHANEM, Azeddine DRAOU (IEEE Senior member)

Abstract: In this paper the use of harmonics elimination method applied to a three level inverter is reported. The method used to calculate the switching angles is clearly shown and discussed. Simulations results using Pspice program and experimental results are carried out to validate the mathematical model. Finally, we applied this harmonics elimination method to control an advanced static VAR compensator (ASVC) which uses a three level voltage source inverter.

In this paper a neutral point clamped inverter having harmonics contents output voltage far less than those of two-level inverter at the same switching frequency is introduced. We also present the modelling and analysis of this new type of inverter used for advanced static var compensation. This ASVC uses three-level voltage source inverter (VSI) transforming a DC component to AC through a set of capacitors, which are used, as a power storage device. Furthermore, a simplified mathematical model of the ASVC is derived, and various simulation results presented using MATLAB.

A FRAMEWORK FOR DESIGNING CASCADED ANALOG FILTERS TAILORED TO MULTIPLE REQUIREMENTS

Liviu Nedelea, Marina Topa, Marius Neag, Lelia Festila

Abstract: The paper presents a computer-aided method and software for designing analog active filters considering an extended set of requirements. It covers all design steps, from the generation of the transfer function to filter synthesis, circuit implementation and verification through simulation. The generation of the transfer function starts with a choice of classical approximations, which can be optimized in respect to an extended set of behavioral and implementation criteria. The filter synthesis is based on the cascaded of first- and second-stages approach; an extensive library of such filter stages offers the designer a wide range of circuit implementation options. The circuit element values are calculated and the complete, Spice-compatible, netlist of the filter is generated. Finally, simulations can be run within the proposed framework. The CAD tool proposed here is an effective, powerful and user-friendly tool for optimized design of complex analog filters, tailored to very specific requirements.

LDPC CODES FOR HIGH BIT-RATE MOBILE COMMUNICATIONS

Zsolt Alfred POLGAR, Florin ARDELEAN, Vasile BOTA, Mihaly VARGA

Abstract: The paper analyzes the BER vs. SINR performances of three classes of LDPC codes, namely the $L(m,q)$ codes, the Kirkman codes and codes generated with a geometrical construction. It presents briefly the construction methods of the control matrices H and emphasizes the code parameters (girth, girth distribution, order of the bit and check nodes in the Tanner graph, code word length) that affect significantly the performances of a LDPC code decoded with the Sum-Product algorithm. The throughput vs. SINR performances of some selected codes are evaluated in an access scheme proposed for the downlink connection of the 4G systems. The throughputs provided by the LDPC-coded adaptive modulation scheme are significantly higher than the ones provided by a non-coded adaptive modulation scheme in the same environment.

A NOVEL HIGH-SPEED VOLTAGE BUFFER WITH LOW DC OFFSET AND OPTIMIZED STEP RESPONSE

A. FAZAKAS, M. NEAG

Abstract: This paper presents a novel high-speed voltage buffer and an effective method for optimizing the step response of this class of circuits. The buffer combines a low offset structure with a signal-dependent biasing technique that results in significant slew-rate enhancement. A set of RC networks provide an effective way of controlling the step-response parameters for a wide range of loading conditions. The compensation elements are sized using the PSpice Optimizer, directly in the time domain; a self adjusting scheme can be implemented, as well. A design example validates the proposed structure and the optimization method.

EFFECTIVE METHODS TO ANALYZE SATELLITE LINK QUALITY USING THE BUILT-IN FEATURES OF THE DVB-S CARD

Radu ARSINTE

Abstract: This paper presents aspects of a simple methodology to evaluate satellite link quality (especially for downlink segment) using accessible technologies and Satellite PC boards (DVB-S). Traditional methods are based on high end testing communication equipment, allowing better results in precision, but with significantly higher costs, not entirely justified in small communications companies or educational environment. The described methodology uses the BER delivered by the source decoder (a standard component in DVB-S receivers), allowing to estimate the C/N (carrier to noise) ratio, and by consequence, of all the main parameters of the satellite link. A limitation is the fact that only the downlink segment could be accurately evaluated, this comparative estimation in most application is more than needed (ex. Satellite TV reception).

A PARTIALLY SEQUENTIAL-PARTIALLY PARALLEL ANALOG IMPLEMENTATION OF A SVM CLASSIFIER

Gabriel OLTEAN, Mihaela GORDAN, Sorin HINTEA

Abstract: The classification task in large data spaces can now rely on newly developed Support Vector Machine technique. A trade-off between the hardware complexity and processing time is a partially sequential- partially parallel implementation of the processing issues based on a description of the vectors as time-continuous signals. We present an analog implementation of a SVM classifier that uses an analog multiplier to compute the dot product between each support vector and the test vector, in a sequential manner. All the dot products necessary to classify a test vector are implemented in

parallel. The correct operation and the accuracy of our analog SVM classifier is proven on the IRIS dataset.

Number 2, 2006

DNA SECURITY BETWEEN TECHNICAL AND SPIRITUAL CONCEPTS

Mircea-Florin VAIDA, Tatiana HODOROGEA

As modern encryption algorithms are broken step by step, the world of information security looks in new directions to protect the data it transmits. The concept of using DNA computing in the fields of cryptography has been identified as a possible technology that may bring forward a new hope for un-breakable algorithms. We need better information security because the people of Earth are in a period of general moral decline. A strong connection exists between material and spiritual life. As the universal maxim goes, "Information is power." Therefore a strong link exists between material and spiritual life. In this work we consider a technical process for protecting medical information and other data assets using a technique of deriving DNA public keys from blood analysis. A DNA encryption technique is further developed here in which a person's medical data is encrypted in DNA strands based on the central dogma of molecular biology. Protection is enhanced by using the patient's own blood mineral levels as a seed for selecting, transmitting, and recovering that person's public key. A lot of spiritual concepts are in connection with the new biometrics and quantum physics discoveries. These concepts are able to offer a deeper mode to understand the human structure and also to consider possible new directions for research in the security domain.

EFFECTIVE VIDEO PROCESSING ARCHITECTURES FOR FACE RECOGNITION ALGORITHMS IMPLEMENTATION

Radu ARSINTE

Abstract: The paper presents a study of autonomous face recognition systems based on high performance DSP, so called Media Processors and on Field Programmable Gate Array (FPGA) devices. An overview of the most powerful Media Processors and FPGAs available today is followed by an analysis of the common features of the face recognition algorithms used to implement an application. The paper presents also a generic system implemented using DSP Media processors, both from a hardware or software perspective. The presentation is focused on the possibility of implementation for face recognition algorithms in embedded systems, taking as examples databases with a limited number of faces. Results, estimations and benchmarks for the generic systems are also presented at the end of the paper.

VOICE BIOMETRICS

Petre G. POP, Eugen LUPU

Abstract: Speaker recognition is the process of automatically recognizing who is speaking based on individual information included in speech waves. This technique makes it possible to use the speaker's voice to verify their identity and control access to services such as voice dialing, banking by telephone, telephone shopping, database access services, information services, voice mail, security control for confidential information areas, and remote access to computers. This paper is a survey of speaker recognition problematic and includes speech signal production, speech signal analysis, speaker recognition principles, speaker recognition methods and performance evaluation.

COMPARING METHODS FOR EXTRACTION OF RELEVANT INFORMATION OF IRIS

Laura Kovacs, Anca Discant, Carol Rus, Sorina Demea

Abstract: Starting with images of real human eye containing information about iris and pupil, images taken from patience, studied a few extraction methods of useful iris information and a classification of these irises by color. The purpose of the paper is to analyze the methods used until now and try new and suitable ideas in the future. In our work it was made an identification of the useful information in the iris circular zone and removed the unuseful information about pupil and external zone of the iris. We focus the work on image analyze and image enhancement, by image filtering, edge detection, dilation and filling. An automatic detection for the center of the iris and pupil zone and a principle of iris classification by the color of them is made also.

FINGERPRINT BASED BIOMETRIC METHODS

Marius TICO

Abstract: Fingerprints are graphical ridge patterns present on human fingers, which, due to their uniqueness and permanence, are among the most reliable human characteristics that can be used for people identification. This paper presents a general overview of the fingerprint-based biometric systems including: image acquisition, image enhancement, feature extraction and fingerprint matching. Some of the most representative algorithms proposed in the open literature are reviewed. A brief description of some algorithms previously proposed by the author is also included.

AN OVERVIEW OF BIOMETRICS**Eugen LUPU, Petre G. POP**

Abstract: Biometric systems allow automatic person recognition based on physical (fingerprint, face shape, iris, palm, DNA) or behavioral (voice, writing style, gait) features which belong to a certain person and cannot be forgotten, lost, copied or stolen like passwords, cards, keys etc. Security biometric methods are more reliable than those based on passwords or PIN. An overview of the biometric systems is presented including history, requests, taxonomy and standardizations. Also, a brief introduction for the most important biometric verifiers and a future view for the multimodal biometrics are presented.

TESPAR A BIOMETRIC TIME DOMAIN APPROACH TO SPEAKER RECOGNITION**Vasile Vlad MOCA**

Abstract: Voice recognition is one of the less intrusive biometric methods available today and one of the few that can be performed online through existing telephone infrastructure. TESPAP coding (Time Encoded Signal Processing And Recognition) has been proved to be a powerful biometric able to extract highly informative features from a large variety of biological bandwidth limited signals [1,2,11,12] like voice, electroencephalogram (EEG), magneto encephalogram (MEG) and electrocardiogram (RCG). In respect to voice and speaker recognition the novelty of the TESPAP method consists in the time domain approach, unlike classical methods (dynamic time warping (DTW), vector quantization (VQ), hidden Markov models (HMM)) mostly based on frequency analysis. The introductory part presents a few practical applications of the TESPAP method in monitoring and classification of human biological signals. Further on the simple TESPAP model is presented along with a short discussion on classification. The last part is focused on speaker recognition applications and tries to motivate why TESPAP can be regarded as a biometric method.

Number 3, 2006

FEC PERFORMANCE EVALUATION FOR 2-11 GHZ IEEE 802.16a SINGLE CARRIER SYSTEM**Nicolae CRISAN**

Abstract: Additional physical layer specifications related to the IEEE 802.16a standard are focused on enhancing the medium access control by providing additional specifications in order to support broadband wireless access at frequencies in-between 2-11GHz. Non license 5GHz radio band, it looks very interesting for the beginning for the most important wireless technologies providers, in their effort to diminish the cost of the new wireless equipments. The standard 802.16 is not yet complete and more simulations are necessary, followed probably by new amendments to the existing ones in the very next years. The article is focused on the FEC block performances evaluation (Forward error correction block) of the 802.16a system, from bit error rate point of view, using System View simulator by Elanix.

GENOMIC SIGNAL PROCESSING (III): FINDING DNA APPROXIMATE TANDEM REPEATS**Petre G. POP**

Abstract: Local repetitions in genomes are called tandem repeats. A tandem repeat contains multiple, but slightly different copies of a repeated unit. It changes over time as the copies are altered by mutations, when additional copies are created by amplification of an existing copy, or when a copy is removed by contraction. These changes let tandem repeats evolve dynamically. The detection of tandem repeats is important in biology and medicine as it can be used for

phylogenetic studies and disease diagnosis. Though extensive work has been done in order to identify tandem repeats, there are inherent limitations with the current approaches in terms of the number of pattern sizes that can be searched or the size of the input length. The purpose of this paper is to present the biological and technical aspects of tandem repeats with focus on signal processing techniques.

ADVANCED CONCEPTS FOR ELEARNING PLATFORMS

Sanda Porumb, Cosmin Porumb, Bogdan Orza, Aurel Vlaicu

Abstract: The most important advantages the information technology provides in the Open and Distance Learning area are dedicated not only to the Virtual Universities but also to the Special Education Programmes. One of the situations can be reached in the govern institutions where the sacked persons want to find a new job in other domain and they need a lot of training. This article describes new concepts used during the development process of the interactive learning service based on a set of applications designed to provide an infrastructure for webcasting, web conferencing capabilities, synchronized video presentation and automated creation of navigable and searchable multimedia archives.

INTEGRATED ENVIRONMENT FOR DISTANT MANAGEMENT OF TUMORS

Bogdan ORZA, Aurel VLAICU, Laura GRINDEI

Abstract: TeleOralTum software is intended to collect on one server specific data from departments that work on the facial cancer diagnosis. Classical medical services imply the existence of a direct link between medical staff in different departments and the patient. Telemedicine is an old concept, which arise debates for more then 30 years. The application that we developed proves the need for a diagnose and management system that will allow a rapid gathering of data, a rapid elaboration of the diagnose, but also elaboration of reports and estimates that are so much needed in this field of medical research. The application works on a three layer distributed architecture, thus taking advantage of a high security for the patient data, easiness in splitting the work among software development teams, and also the easiness in which other medical departments can be added to the application. The user administration section is used to divide the accessibility domain for different types of client users. The architecture of TeleOralTum is an innovative one and has at its origin open-software tools.

DESIGNING ON LINE EVALUATION TESTS FOR eLEARNING

Laura V. GRINDEI Aurel VLAICU Bogdan ORZA

Abstract: On line tests, along with other evaluation activities, offer students an opportunity to apply the concepts, skills, and attitudes they have learned within eLearning programs. Therefore, well designed on line tests provide a reliable way to measure progress objectively. This paper present general strategies that can enhance professors/ instructors ability to design on-line tests that are effective in motivating, measuring, and reinforcing eLearning.

Number 4, 2006

MATLAB MODELING AND FPGA IMPLEMENTATION OF NEURONAL ALGORITHMS FOR BLIND AUDIO SIGNAL SEPARATION

B. S. KIREI A.FAZAKAS Marina TOPA

Abstract: A number of applications in a variety of areas comprise the task of obtaining certain signals called sources, which are not directly accessible, but have to be extracted from a set of measurable signals regarded as mixtures of sources. As neither the source signals nor the mixing structure are known, this is referred to as the blind source separation problem. This paper deals with the FPGA implementation of neural networks controlled by adaptive learning algorithms for blind source separation. The register transfer level model of the

neural network is achieved in Simulink, the FPGA implementation is done using advanced design techniques as MicroBlaze microcontroller and creation of custom peripherals. To ease the test of the algorithms a graphical user interface in the MATLAB environment has been developed.

MODELING THE RAYLEIGH-FADED MOBILE RADIO CHANNEL

Zsolt Alfred POLGAR, Vasile BOTA, Mihaly VARGA

Abstract: The paper proposes two joint mathematical characterizations of the mobile multipath Rayleigh-faded radio channels and of two possible OFDMA-type multi-user access techniques appropriate for high bit rate mobile transmissions. These mathematical models are used to compute the probability density functions (p.d.f.) of the received SNR and its state probabilities and to build Markov-chain models that describe jointly the channel and the multi-user access technique. The paper also discusses the effects of the number of active users and their speed upon the p.d.f. of the received SNR and upon the state and state transition probabilities for the access methods considered.

ECHOGRAPHIC MEASUREMENTS USING AN IMAGE PROCESSING APPLICATION

Mircea-Florin VAIDA, Valeriu TODICA

Abstract- The aim of the paper is to present a flexible dedicated application, Healthmag, able to integrate different medical facilities. Representative quantitative parameters are used for echographic measurements. Important facilities concerning the preprocessing, specific quantitative parameter measurements, data visualization are considered for medical investigations.

PERFORMANCE EVALUATION OF H-ARQ ADAPTIVE CODED QAM TRANSMISSIONS OVER MULTIPATH MOBILE CHANNELS

Vasile BOTA, Zsolt Alfred POLGAR, Mihaly VARGA

Abstract: This paper presents the evaluation of the average spectral efficiencies provided by the adaptive employment of a set of LDPC-coded QAM modulations in an OFDMA downlink scheme governed by an H-ARQ protocol over mobile radio channels. It discusses the selection of the set of coded modulations, the setting of the SNR domains where they should be employed and shows the computation of the average spectral efficiency provided by this approach in non-ARQ or H-ARQ applications. The paper also includes some considerations about the joint modeling of the channel and user-access method employed. Finally, some conclusions about the influences of various system parameters upon the average spectral efficiency and error rates are also presented.

THE MANAGEMENT INFRASTRUCTURE OF A NETWORK MEASUREMENT SYSTEM FOR QOS PARAMETERS

Alexandra BIKFALVI, Paul PATRAS, Cristian Mihai VANCEA, Virgil DOBROTA

Abstract: The paper presents the designing principles of a management infrastructure for monitoring the capabilities of different network interface cards (Gigabit Ethernet, Endace), both for traffic generation and capturing at reception. This evaluation is useful to assess the goodness of captured traffic analysis and QoS performance measurements, using PC based platforms. The idea was to implement the communication of the management information between an administration console and a set of distributed SNMP-based software measurement agents for GNU/Linux platforms that enable to perform QoS measurement sessions.