

IP-WiS

International Conference on Information Processing and Wireless Systems

March 16, 17 and 18 2012, Tej MARHABA Sousse Tunisia



Planning

	Friday March 16, 2012	Saturday March 17, 2012	Sunday March 18, 2012	
8:00 - 8:30	Registration	Registration	Registration	
8:30 - 9:00		Plenary Session 2	Plenary Session 4	
9:00 - 9:30				
9:30 - 10:00		Oral Sessions Room A : Papers 1, 2 and 31 Room B : Papers 25, 41 and 48	Oral Sessions Room A : Papers 9, 21 and 29 Room B : Papers 13, 23 and 43	
10:00 - 10:30		Coffee Break	Coffee Break	
10:30 - 11:00		Oral Sessions Room A : Papers 44, 53 and 56 Room B : Papers 26, 52 and 55	Oral Sessions Room A : Papers 4 and 5 Room B : Papers 58, 59 and 61	
11:00 - 11:30		Poster Sessions 2 Papers 11, 32, 60, 64 and 65	Poster Sessions 3 Papers 8, 22, 33, 42 and 49	
11:30 - 12:00		Lunch	Lunch	Closing and Lunch
12:00 - 12:30				
12:30 - 13:00				
13:00 - 13:30				
13:30 - 14:00	<ul style="list-style-type: none"> • Allocution of the Minister of Higher Education and Scientific Research (15') • Allocution on The Minister of Communication Technologies (15') & Plenary Session 1 (60')	Plenary Session 3		
13:30 - 14:30				
14:00 - 14:30	Coffee Break	Oral Sessions Room A : Papers 14, 16 and 46 Room B : Papers 10, 15 and 45		
14:30 - 15:00				
15:00 - 15:30	Oral Sessions Room A : Papers 18, 62 and 63 Room B : Papers 12, 17 and 50	Coffee Break		
15:30 - 16:00				
16:00 - 16:30	Poster Sessions 1 Papers 3, 6, 20, 35, 39 and 47	Oral Sessions Room A : Papers 7, 30 and 38 Room B : Papers 19, 40 and 54		
16:30 - 17:00				
17:00 - 17:30				
17:30 - 18:00				
18:00 - 18:30				
18:30 - 19:00				
20:00		GALA DINNER		

Oral Session

Session 1A-1: MIMO OFDM Friday PM, March 16 , 2012, Room A Chair: Ammar BOUALLEGUE ; Co-chair: Hichem BESBES		
ID	Title	Authors
18	Joint ML and MAP Channel Estimation for MIMO-OFDM System Under High Mobility Conditions	Zaier Aida and Bouallegue Ridha
<p>Abstract :</p> <p>In this paper, we propose an improvement of the Maximum Likelihood estimator in a MIMO OFDM (Multi Input Multi Output - Orthogonal Frequency Division Multiplexing) system. As known, the combination between the two techniques allows spectral efficiency and increased throughput.</p> <p>Thus, this work focuses on channel estimation in a MIMO context based on a rigid estimator which is the maximum likelihood one and which has been used as a tracker of the channel in others works. Then, we will compare the performance of this estimator with the Maximum A Posteriori one (MAP) since it demonstrates too its effectiveness.</p> <p>The performance of the estimator will be expressed in term of bit error rate BER versus the signal to noise ratio SNR. For a (2,2) MIMO system, our simulations results shown a great enhancement comparing to related works as for different schemes of the MIMO system .</p>		
62	PAPR reduction for SFBC MIMO-OFDM systems	Laabidi Mounira, Zayani Rafik and Bouallegue Ridha
<p>Abstract :</p> <p>Multiple input multiple output techniques, combined with orthogonal frequency division multiplexing (MIMO-OFDM), provide a promising approach for wireless systems. However, a serious drawback of the OFDM system consists in the high peak-to-average power ratio (PAPR) which may severely affect the power efficiency of RF power amplifiers. In this paper, we propose two methods to reduce the PAPR of SFBC MIMO-OFDM signals based on the rotation and inversion across antenna. To secure the efficiency of these methods, we compare them with Polyphase Interleaving and Inversion method.</p>		
63	Mimetic Crossover Neural Network Predistortion for the compensation of memory crosstalk and HPA nonlinearity effects on MIMO-OFDM systems	Hanen Bouhadda, Rafik Zayani, Ridha Bouallegue and Daniel Roviras
<p>Abstract :</p> <p>In this paper, we investigate the joint effects of memory crosstalk and HPA nonlinearity in multicarrier OFDM-MIMO systems by proposing a new structure of Neural Network Predistortion which consists to eliminate those effects. Then, we will compare those results with those already obtained in [1].</p>		

The algorithm used to train the neural network is the Levenberg-Marquardt one (LM), which has proven in [2] to exhibit a very good performance with lower computation complexity and faster convergence than other algorithms used in literature. The present results were observed for the Alamouti STBC MIMO-OFDM system in terms of Bit Error Rate (BER) in Rayleigh fading channel.

Session 1B-1: Antennas
 Friday PM, March 16 , 2012, Room B
 Chair: Taoufik AGUILI; Co-chair: Henri BAUDRAND

12	Interaction between Five-Layered Human Head Model and a Half- Wave Dipole Antenna	Hafawa Messaoudi and Taoufik Aguil
<p>Abstract :</p> <p>The interaction between a five-layered human head model and a half-wave dipole antenna is analyzed in this paper. It is well known, that some of the radio waves emitted by a mobile phone handset are absorbed by the human head. The specific absorption rate (SAR) is a defined rate to evaluate the power absorbed by biological tissue. The results show that the SAR distribution is influenced by various parameters such as antenna position relative to the human head, polarization and distance, the shape and geometry of the head. Whether or not those parameters affect significantly antenna performances specially its radiation pattern. The antenna radiation pattern and other characteristic are significantly altered by the presence of the human head.</p>		
17	Synthesis and implementation of Phased Circular Antenna Arrays Using Taguchi Method	Nadhem Nemri, Amor Smida, Ridha Ghayoula, Hichem Trabelsi and Ali Gharsallah
<p>Abstract :</p> <p>This paper is aimed at assessing the effectiveness of the phase-only control strategy based on a customized Taguchi method when applied to Uniform Circular Arrays (UCA). The objective of this paper consists to contribute the main lobe optimization of the smart antenna using Taguchi's method. We used the cited method in order to determine phase's weights for each element of the circular antenna array in order to steer the principal lobe from -65° to 65° covering all angular space. After that, we made an electronic platform using the microcontroller STM8S in order to implement an intelligent system. The architecture of this work had used a digital phase shifters, a demodulator AD8347, a modulator AD8349, an array antenna, cards STM8S-Discovery.</p>		
50	A Smart Antenna System based on Planar Array Antenna	Faten Ben Ghenaya and Ridha Ghayoula
<p>Abstract :</p> <p>In this paper, a novel design of smart antenna system based on planar (ring) array antenna beamforming is proposed. The goal of the design is to construct smart antenna beamforming systems with uniformly spaced radiating elements and with equal amplitude and phase excitation have long been used for the purpose of obtaining good omnidirectional patterns in the plane of the array. However, the mutual coupling effects will be introduced.</p> <p>To verify the performances of the proposed technique, a 4-elements array has been realized and tested for various types of beam configurations.</p>		

1	Performance Evaluation of a Hybrid LS-LMMSE Channel Estimation Technique for different LTE Downlink Systems	Abdelhakim Khlifi and Ridha Bouallegue
<p>Abstract :</p> <p>In this paper, we propose to study the performance of the hybrid LS-LMMSE channel estimation technique for different LTE Downlink systems. LTE Downlink system is based on a MIMO-OFDMA technology. In OFDM systems, in order to mitigate both inter-carrier interference (ICI) and inter-symbol interference (ISI) caused by the multi-path propagation, a cyclic prefix inserted at the beginning of each transmitted OFDM. The inserted cyclic prefix length is defined to be equal to or longer than the channel length. However, and due to some unforeseen channel behavior, the cyclic prefix can be shorter than the channel length. In previous works, we have studied the performance of Least Square (LS) and Linear Minimum Mean Square (LMMSE) estimators under the effect of the channel length, we have concluded that in the case where the cyclic is equal to or longer than the channel length, LMMSE performs better than LS estimator. In the other case, LMMSE still performs better than LS estimator but this time for only low SNR values. For high SNR values, LS estimator shows better performance. Therefore, we have further proposed a hybrid LS-LMMSE channel estimator robust to the channel length effect. LTE provides a scalable bandwidth from 1.25 MHz to 20 MHz. Each LTE downlink system has its own technical specifications in terms of frequency sampling, FFT size,... In this paper, we will study the performance of the proposed hybrid LS-LMMSE channel estimator for different LTE Downlink systems. MATLAB Monte -Carlo simulations are used to evaluate the performance of this estimator in terms of Mean Square Error (MSE) and Bit Error Rate (BER) for 2x2 LTE Downlink systems under the channel length effect.</p>		
2	Performance of Channel Estimation Techniques for LTE Downlink Systems under the Channel Length Effect	Abdelhakim Khlifi and Ridha Bouallegue
<p>Abstract :</p> <p>In this paper, we propose to study the impact of the channel length of the performance of channel estimation techniques for LTE Downlink systems. LTE Downlink system is a multiuser system based on a MIMO-OFDMA technology. Usually, in OFDM systems, before transmitting an OFDM symbol, a guard interval called cyclic prefix (CP) is inserted at the beginning of each transmitted OFDM symbol in order to mitigate both inter-carrier interference (ICI) and inter-symbol interference (ISI). Usually, the inserted cyclic prefix is chosen equal to or longer than the channel length. However, because of some unforeseen channel behavior, the cyclic prefix can be shorter. In this paper, we interest to study the performance of channel estimation techniques in the two cases. Simulations results show that in the case where the cyclic prefix is equal to or longer than the channel length, LMMSE and SVD estimators perform better than LSE but at the cost of computational complexity. LSE performs better than SVD estimator only for very high SNR values. In the other case, LMMSE and SVD estimators look to perform better than LS but only for low SNR values. In the other hand, LS looks the better for LTE Downlink systems for high SNR values. MATLAB Monte-Carlo simulations are used to evaluate the performance of LS, LMMSE and SVD in terms of Mean Square Error (MSE) and Bit Error Rate (BER) for 2x2 LTE</p>		

Downlink systems under the channel length effect.

31 A Study of Channel Estimation for 3GPP's SPATIAL CHANNEL MODEL Extended in Downlink LTE Systems

Samia Dardouri and Ridha Bouallague

Abstract :

In this paper, we study the channel estimation algorithms for the downlink LTE systems of 3GPP. By using computer simulation, the pilot signal assisted channel estimation algorithms based on least square (LS), linear minimum mean square error (LMMSE) criteria and SVD-LMMSE channel estimation, together with channel interpolation based on linear interpolation. The channel model is chosen as a typical urban scenario modeled by Spatial Channel Model Extended (SCME), which is implemented with the LTE downlink structure in this paper. The performance is measured using the mean square error (MSE) between LMMSE estimator with optimal rank reduction by singular value decomposition (SVD) can improve the estimation performance effectively. All channel estimation algorithms are simulated. The simulation conclusion is that the new channel estimations are more efficient. We conclude that the channel frequency responses of pilot tones are estimated by using SVD-LMMSE estimator, and the channel frequency responses of data tones are interpolated by linear based interpolation method is appropriate for the downlink of 3GPP LTE systems.

25	Model Checking Techniques for Verification of an Encryption Scheme for Wireless Sensor Networks	Zohra Sbaï and Mohamed Escheikh
<p>Abstract :</p> <p>In this paper, we deal with the formal verification of an encryption scheme for Wireless Sensor Networks (WSNs). Especially, we present our first results on building a framework dedicated to modelling and verification of WSNs aspects. To achieve our goal, we propose to specify WSNs models written in Petri nets using Promela constructs in order to verify correctness properties of them using SPIN Model checker. We first specify in Promela a Petri net description of an encryption scheme for WSNs that describes its behavior. Then, correctness properties that express requirements on the system's behavior are formulated in Linear Temporal Logic (LTL).</p> <p>Finally, SPIN model checker is used to check if a specific correctness property holds for the model, and, if not, to provide a counterexample: a computation that does not satisfy this property. This counterexample will help to detect the source of the eventual problem and to correct it.</p>		
41	Simulation of Polarization Strategies of Multiple Antennas System over Rich Scattering Environment Using the Von Mises Distribution	Maha Ben Zid
<p>Abstract :</p> <p>The aim of this paper is to present a comparative study of polarization strategies of multiple antennas systems over a realistic propagation environment with rich scatterers. We investigate the von Mises distribution for the analysis of the capacity of the communication systems with different polarizations. We demonstrate in this paper that the polarization strategy that performs better still depends on the distribution characterizing the scattering phenomena within the propagation environment.</p>		
48	Performance Analysis of Neural Network Compensator for MIMO-STBC System in Presence of HPA Nonlinearity and Channel Estimation Error	Oussama Ben Hadj Belkacem, Ammari Mohammed Lassaad, Rafik Zayani and Ridha Bouallegue
<p>Abstract :</p> <p>In order to provide high data rate over wireless channels and improve the system capacity, Multiple-Input Multiple-Output (MIMO) wireless communication systems exploit spatial diversity by using multiple transmit and receive antennas. Maximal Ratio Combining (MRC) detection is a simple and effective combiner technique for retrieving multiple transmitted data streams at the receiver. However the detection requires knowledge of the Channel State Information (CSI) and in practice accurate CSI may not be available. Moreover, to achieve high data rate and fulfill the power, MIMO systems are equipped with High Power Amplifiers (HPAs).</p> <p>However, HPAs cause nonlinear distortions and affect the receiver's performance. Since a few decades, Neural Networks (NN) have shown excellent performances in solving complex problems (like classification, recognition, approximation). In this paper, we investigate the effect of</p>		

channel estimation error on the performance of MIMO Space-Time Block Coding (STBC) receiver in the presence of nonlinear HPAs and NN. By modeling the estimation error as independent complex Gaussian random variables, we assess the impact of HPA nonlinearity and NN on the SNR derivation and the Symbol Error Rate (SER) in uncorrelated Rayleigh fading channels. Computer simulation results confirm the accuracy and validity of our proposed analytical approach.

Session 2A-2: μ Wave Structures
 Saturday AM, March 17, 2012, Room A
 Chair: Ali GHARSALLAH; Co-chair: Jamel BELHAJ TAHAR

44	Applying Renormalization Group to Multi-modal Surface Impedance Operator for Diffraction Analysis	Taha Ben Salah, Chiraz Aguilu and Taoufik Aguilu
<p>Abstract :</p> <p>In this paper we discuss a new accurate method for analyzing diffraction of a fractal shaped structure ad infinite iteration using a combination of the Renormalization Group Theory and the Multi-modal surface impedance Operator. This new approach helps calculating input impedance of the structure where no other method pretends being able to provide a concrete characterization of such infinitely complex multi-scale structure.</p>		
53	New Tunable Phase Shifter Using Loaded Stepped Impedance Structure	Mohamed Ould Elhassen, Mohamed Mabrouk, Philippe Benech and Adel Ghazel
<p>Abstract :</p> <p>This paper presents a stepped impedance tunable phase shifter. We give the design of stepped impedance low-pass filter having a maximally flat response and cutoff frequency of 2.4GHz. In order to tune our circuit characteristics and to modify to insertion phase, we use a varactor diode; good phase dynamic was obtained with good insertion and return loss</p>		
56	Tunable Coupled Line Phase Shifter based on Modified Schiffman Approach	Mohamed Ould Elhassen, Mohamed Mabrouk, Philippe Benech and Adel Ghazel
<p>Abstract :</p> <p>This paper describes theoretical study, modeling and simulation of tunable coupled line phase shifter. This structure is based on Schiffman model in which a coupled uniform Microstrip transmission line was used. The main idea of this work is to design a mixed structure tunable phase shifter using Schiffman model loaded by Varactor diode. We have evaluated the performance of two circuits; a good variation of phase shifting is denoted with high performances.</p>		

Session 2B-2: UWB
 Saturday AM, March 17, 2012, Room B
 Chair: Nouredine HAMDI; Co-chair: Tan-Hoa VUONG

26	Design of Tracking Loop for UWB Systems	Rshdee Alhakim, Kosai Raof and Emmanuel Simeu
<p>Abstract :</p> <p>Timing synchronization and tracking represent major challenges in carrying out highly efficient Ultra-WideBand (UWB) communications. The Delay-Locked Loop (DLL) method is widely proposed to maintain satisfactory synchronization. In this paper, we suggest a novel DLL structure design for UWB systems based on an approach called Timing with Dirty Template. This approach promises to improve tracking performance while maintaining low-complexity structure. The parameters of the proposed DLL will be selected to optimize tracking behavior in the presence of the ambient noise and Doppler effects. Simulation results show noise and transient performance across various parameter values.</p>		
52	The Tumor Detection by the UWB Radar	Elmissaoui Taoufik and Ridha Bouallegue
<p>Abstract :</p> <p>The UWB system in medicine consists of sending electromagnetic waves and analyzing the echo in order to create an image of each layer that composes the human body. In this paper, we propose a new method which enables us to detect and locate a tumor in the human body. In fact, we study the electric characteristics of each normal human body layer. Similarly, we present the echo reflected by a normal layer and a layer that contains cancer. These echoes permit our radar system to detect and locate cancer in each region in the human body. Our system enables doctors to detect cancer at first stage and that facilitates the treatments.</p>		
55	A 60-GHz CPW-Fed Antenna for WPAN Applications	Zied Harouni, Lotfi Osman, Amel Fatnassi and Ali Gharsallah
<p>Abstract :</p> <p>An efficient 60 GHz coplanar waveguide (CPW) fed patch antenna is proposed. This antenna is implemented on a high dielectric constant substrate ($\epsilon_r = 9.9$), which is close to the dielectric constant of commercial GaAs and CMOS process. The antenna structure combines the advantages of CPW with those of the aperture-coupled microstrip antenna and simplifies the structure of the antenna by reducing the number of metallization level, from three down to two. This feed design eliminates the competition for surface space between the antenna elements and the feed network.</p>		

14 Integration of LDPC codes in MIMO systems

Sana Ezzine, Ons Ben Rhouma and
 Ammar Bouallegue

Abstract :

Wireless channels are subject to physical constraints responsible for several types of disturbances : noise, fading, multipath propagation, interference, etc. So it is beneficial to use multiple-antenna systems which are very efficient to reduce the impact of these problems on the performance of communication system. Furthermore, LDPC codes are error-correcting codes that provide exceptional performance in terms of bit error probability. We refer to MIMO-LDPC system, the MIMO systems which the LDPC code have been applied.

This paper treats the integration of LDPC codes in MIMO system. For that, we will analyze the performance in terms of bit error rate of multi-antenna systems by integrating the irregular LDPC codes in those systems according to various parameters such as the number of iterations in decoding, the number of transmitting antennas, the number of receiving antennas and the length of the LDPC code. We show that the MIMO-LDPC can achieve the good error rate performance with increased number of iterations in decoding, the number of transmitting antennas and the number of receiving antennas. We also show that the increase of length LDPC codes does not affect error rate performance.

16 Coded modulations for space-time codes

Houda Sboui, Ammar Bouallegue and
 Patrick Solé

Abstract :

In this paper, we focus on the case of quasistatic MIMO fading channels when we use concatenated coding schemes. We concatenate tow codes : an inner code which guarantees full diversity and an outer code which ensures coding gain. An outer code can be designed by taking the quotient of the algebra by a two-sided ideal which leads to matrices over finite alphabets for the outer code. We present coded modulation schemes for algebraic space-time codes having the Golden code as inner code.

For the outer code, we begin by studying codes constructions over the finite rings $M_n(F_3)$ and $M_n(F_2)$ and then we give their multilevel encoders for these rings.

46 quantum convolutional codes

Anis Mahmoudi and Ammar
 Bouallegue

Abstract :

The main purpose of this paper is to present a theory of quantum serial turbo codes and describe their iterative decoding algorithm with a depolarization channel. We define a quantum analogue of a state diagram that provides an efficient way to verify the properties of a quantum convolutional code, and in particular, its recursiveness and the presence of catastrophic error propagation.

In our constructions, the convolutional codes have thus been chosen to be noncatastrophic and nonrecursive. While the resulting families of turbo

codes have bounded minimum distance, from a pragmatic point of view, the effective minimum distances of the codes that we have simulated are large enough not to degrade the iterative decoding performance up to reasonable word error rates and block sizes. With well-chosen constituent convolutional codes, we observe an important reduction of the word error rate as the code length increases.

Session 2B-3: UWB & RFID
 Saturday PM, March 17, 2012, Room B
 Chair: Fethi CHOUBANI; Co-chair: Khaled GRAYAA

10	Impact of timing mismatch on the performance of a differential receiver	Karima Ben Hamida El Abri and Ammar Bouallègue
Abstract : This paper studies the influence of timing error on the BER (Bit Error Rate) performance of a DS-UWB (direct sequence ultra wide-band) system. Through simulation, we show that the reception quality of an UWB system remains good if the error doesn't exceed $3T_{\omega}$. Beyond this value, we constate a degradation of the system performance.		
15	Inkjet-Printed rectangular with elements parasitic monopole antenna for RFID applications.	Sabri Beldi, Rachida Bedira and Ali Gharsallah
Abstract : In this paper inkjet-printed antenna on paper based substrates as solution for the mass production of ultra-low cost Radio Frequency Identification (RFID). As the growing interest for low cost, flexible, efficient electronics for automatic identification and sensing application increase materials and integration technique become more complexes.		
45	A Broadband Antenna for Passive UHF RFID Tags	Mondher Dhaouadi and Mohamed Mabrouk
Abstract : A broadband antenna for passive UHF RFID Tag is presented. The reactance component of tag antenna considered chip impedance (-193j) is conjugated and matched for maximum power transmission. The antenna is fabricated by using Polyester (PET) dielectric substrate with permittivity 3.2. The size of antenna is $85 \times 22 \times 0.05$ mm. The HFSS simulator is used for optimizing the proposed antenna. The antenna Return Loss is of 14.0 dB for the worst case in the middle of UHF range, better than 35.3 dB at 914 MHz.		

Session 2A-4: Complex systems, Localization and Metamaterial Antennas

Saturday PM, March 17, 2012, Room A

Chair: Kosai RAOOF ; Co-chair: Larbi HADJ SLAMA

7	Using fuzzy cognitive maps for the modeling of complex systems	Farid Lassoued and Ridha Bouallegue
<p>Abstract :</p> <p>The fuzzy cognitive maps are qualitative tools which can capture the extent from cause to effect in the links that exist within a complex system such as the information system. These cognitive maps are a simple way of representing knowledge with a huge capacity of interpreting the information. Indeed, they are exploited for the decision-making, the prediction of future states and the explanation of past actions. Added to these capacities, when the information is applied and propagated through the model, the topology of the map itself can be used in the diagnosis of breakdowns by identifying the causes of the nodes of interest.</p> <p>The main objective of this paper is the conception of impact analysis of engine of rules in an environment object in which objects and their links of impact (CIs: elementary components of the information system contributing to the delivery of a service), are neither defined nor ordered and the real time restoration of the results analysis of impact and presentation according to the various orchestrated processes. Thus our role is to conceive a design of impact analysis and its development guaranteeing in times of answer by using the inference of the fuzzy cognitive maps.</p>		
30	A Tri-Band Zeroth-Order Metamaterial-Loaded Monopole Antenna for ISM Applications	Nabil Dakhli, Mohamed Hayouni, Fethi Choubani and Jacques David
<p>Abstract :</p> <p>The ISM protocol has already been used for a long time to realize customer-specific communication solutions for short and middle distances, which ensure an efficient data transfer, a better reliability and good adaptation for applications which require a low rate of data transfer.</p> <p>The objective of this work is to design a tri-band low-profile small-footprint antenna, which supports the European 434 MHz/868 MHz and the US 315 MHz ISM bands. The radiation mechanism of the antenna is based on the posts, which are connected in series to an inductor at each edge of a transmission line in between. Calibrating the flowing currents in the vias by tuning the inductances values, radiated fields are constructive in the far field region. Full-wave simulations were carried in order to study the properties of the antenna at three different frequencies. The antenna offers a fractional bandwidth of 0.59 %, 0.87% and 2.18%, a radiation efficiency of 12.54%, 38.66% and 77.36% at 315 MHz, 434 MHz and 868 MHz respectively, also a fully omnidirectional, vertically polarized, monopole-like radiation patterns are observed at each band.</p>		
38	Indoor Localization using Fingerprinting Technique and Local Linear Estimator	Nadia Aloui, Ammar Bouallegue and Kosai Raouf
<p>Abstract :</p> <p>In Line-Of-Sight (LOS) environment and Non-Line-Of-Sight (NLOS) circumstances, range-based algorithms such as lateration may fail to offer good localization accuracy. Therefore, fingerprinting technique is preferred. In this paper, we propose a fingerprinting localization scheme based on Time Of Arrival (TOA). The estimated TOA is determined by the instant of the maximum cross correlation between the received signal and</p>		

the source signal. The main contribution of this paper is to apply the kernel linear estimator as a matching algorithm. The simulation results have shown that the novel localization scheme estimates location within 0.24 m accuracy and 70% precision. Compared to existent algorithms, namely lateration, nearest neighbor and 4-nearest neighbors algorithms, the proposed scheme brings better performance.

19	Arabic Speech Recognition by Stationary Bionic Wavelet Transform and MFCC using a Multi Layer Perceptron for Voice Control	Talbi Mourad, Bennisr Mouhamed and Cherif Adnane
<p>Abstract :</p> <p>In this paper, we have proposed a new technique of Arabic speech recognition with mono-locutor and a reduced vocabulary. This technique consists at first step in using our proper speech database containing Arabic speech words which are recorded by a mono-locutor for a voice command. The second step consists in features extraction from those recorded words. The third step consists in classifying those extracted features. The features extraction is performed by applying the Stationary Bionic Wavelet Transform (SBWT) to each recorded word at first, the Mel Frequency Cepstral Coefficients (MFCCs) are computed from the vector obtained from the concatenation of the obtained Stationary Bionic Wavelet Coefficients. The obtained MFCCs were then concatenated in order to construct one input of a Multi-Layer Perceptual (MLP) used for features classification. In the MLP learning and test phases, we have used ten Arabic words each of them was repeated twenty five times by the same ocator. A simulation program used to test the performance of the proposed technique showed a classification rate equals to 98%.</p>		
40	Evaluation of an Acoustic Model for Cochlear Implants Based on Frequency Estimation	Mourad Ghrissi and Adnen Cherif
<p>Abstract :</p> <p>Most speech processing strategies in cochlear implants encode only coarse spectral features of the speech signal because of the limited number of physical electrodes inserted in the cochlea. Some new strategies aim to increase notably the spectral resolution by implementing virtual channels in order to encode more accurately spectral cues like formant transitions. A new acoustic model for such speech processing strategies is presented in this paper. It is based on instantaneous frequency estimation within each output of the filter bank. Besides the selection of the frequency bands used in the stimulation stage is different from previous methods as it is based on the values of the estimated frequencies. Objective analysis of acoustic models showed that the new strategy encoded more accurately formant transitions when compared to the classic CIS strategy. A subjective analysis with normal hearing listeners showed that using this strategy yielded to better performance in terms of vowels and consonants identification when compared to the CIS strategy.</p>		
54	OPTIMAL LIFTING BLOCK FOR WAVELET-BASED VIDEO CODING	Nabil Chaabani, Tahar Ezzedine and Ammar Bouallègue
<p>Abstract :</p> <p>Motion-compensated lifting scheme have become a reference for the temporal filtering of video data. However, blockbased motion estimation and compensation produce annoying blocking artifacts around the moving objects and near the borders of the images.</p> <p>In this paper, in the foreground, we will recognize the concept of lifting scheme in general, and then we will give a brief outline on the temporal lifting scheme of Secker and Taubman, we'll finally explained the method of lifting scheme oriented region where there is a proposed lifting transformation algorithm in wavelet and justifying the choice of the parameters used.</p>		

Session 3A-1: Protocols
 Sunday AM, March 18, 2012, Room A
 Chair: Mounir FRIKHA; Co-chair: Kaouther SETHOM

9	Integrating Service Discovery with Reactive Routing Protocol for Mobile Ad Hoc Network	Maher Heni and Ridha Bouallegue
<p>Abstract :</p> <p>Mobile ad-hoc networks have a very high increase in academic and industrials areas, and open several research challenges. Results of these challenges are nodes resources that present a critical factor. One of the contributions of ad-hoc networks is that any node can use a service provided by any node in the network and through the multi-hop. This procedure is known as the discovery service. Service is defined as the entity may be a software or hardware that can be used by a user network. To provide these features and meet the requirement to reduce the consumption of critical factors, the aim of this paper is to propose a reliable solution for service data exchange provided by various nodes in the wireless ad-hoc networks and integrate it with a reactive routing protocol. The integration of service discovery with routing protocol present the advantage of running just one layer instead of two and then minimize the waste of resources.</p>		
21	Performance of a reconciliation method operating on a discreet quantum key distribution system	Nedra Benletaief, Houria Rezig and Ammar Bouallegue
<p>Abstract :</p> <p>Reconciliation is a mechanism allowing to weed out the discrepancies between two correlated variables. It has great role in every Quantum Key Distribution protocol where the key has to be transmitted through a noisy channel or as in our case of study in presence of an eavesdropping. In this paper, we show that for discrete-variable QKD protocols, this problem can be advantageously solved with Turbo codes. In particular, we demonstrate that our method leads to a significant improvement of Bit Error Rate, may divide it by three in presence of a eavesdropper even with great eavesdropping capability.</p>		
29	Call Admission Control in IEEE 802.16 : Comprehensive Survey and Taxonomy	Ahlem Saddoud and Lamia Chaari
<p>Abstract :</p> <p>WiMAX (worldwide Interoperability for Microwave Access) is the next step in the mobile technology evolution path. It competes with IEEE 802.11-based WLAN technology, broadband residential Internet technologies and third generation cellular technologies. Quality of service (QoS) is still an important subject that deals with the WiMAX performance. WiMAX can provide QoS guarantees for different service classes with diverse QoS requirements. Call Admission Control (CAC) is an important QoS component in WiMAX networks as it has a strong relationship with QoS parameters such as delay, dropping probabilities, jitter and scalability ... The IEEE 802.16 standard does not define any CAC scheme so it is still an open issue for researchers and service providers. The purpose of this paper is to provide a survey on CAC mechanisms in WiMAX networks. We give an understanding of the different technical issues of CAC approaches that researchers are currently facing to ensure QoS support in IEEE 802.16 wireless networks. We provide an insight into the new research interest in this field, we classify, and we compare diverse CAC schemes proposed in the literature.</p>		

Session 3B-1: μ Wave Numerical Methods
 Sunday AM, March 18, 2012, Room B
 Chair: Houria REZIG ; Co-chair: Lotfi OSMAN

13	New modal analysis to decompose central arbitrary located source in Planar Almost Periodic Structures	Bilel Hamdi and Taoufik Aguil
<p>Abstract :</p> <p>In this paper, we provide an efficient new spectral analysis which is important to study a 1-D periodic phased array planar structure excited by arbitrary located sources. The latest demands an accurate evaluation to analyze the modal input impedance in one unit cell with the proper current density appearing on the metal part. The formulation that is proposed to solve the problem allows to study all neighbouring elements in a periodic environment. A Method-of-Moment (MoM) technique based on a simulation code is presented for the analysis of the basic cell (unit cell)</p>		
23	Electromagnetic Scattering of a Dielectric Coated Conducting Elliptic Cylinders using WCIP Method	Jamila Selmi, Rachida Redira and Ali Garsallah
<p>Abstract :</p> <p>The problem of scattering of an incident plane wave by metallic and covered objects of arbitrary shape has attracted considerable attention in telecommunication, antenna design, and electromagnetic compatibility for decades. Many techniques have been proposed to solve the problem of electromagnetic wave, such as the Moment Method (MOM) and the Finite Element Method (FEM). In this work, the Wave Concept Iterative Process (WCIP) has been presented and applied to analyse the electromagnetic scattering problems of arbitrary shape bodies. This particular study was inspired by work to analyse electromagnetic scattering of conductor elliptic cylinder covered with thin dielectric material in free space. The elliptic cylinders are used to approximately model several real structures, such as aircraft, fuse large and other cylindrical bodies. These elliptic surfaces can be divided in the small cells, these cells can be placed on fictitious circular cylinder, so the electromagnetic problem in the cylindrical coordinates system can be resolved. Numerical results illustrate the scattering current density and Radar Cross Section (RCS) for different size of a metallic elliptic cylinder, and for different materials.</p>		
43	Numerically Efficient Mode Selection Technique for MoM based Diffraction Analysis	Taha Ben Salah, Chiraz Aguil and Taoufik Aguil
<p>Abstract :</p> <p>This paper discusses a numerical optimization technique based on mode functions selection for fastening MoM EM analysis of planar obstacles placed in an infinite waveguide. This technique pretends to give acceptable results while enhancing significantly calculation performance. Particularly, results for the technique's application on a planar Cantor shaped obstacle are provided</p>		

Session 3A-2: Channel Estimation & Fuzzy Complex Structures

Sunday AM, March 18, 2012, Room A

Chair: Abdellaziz SAMET; Co-chair: Rafik ZAYANI

4 Performance Evaluation of Modified Alamouti Decoding in DVB-T2 Systems using Practical Channel Estimation

Aymen Omri, Ali Hazmi, Ridha Hamila and Ridha Bouallegue

Abstract :

In this paper, we present a performance evaluation of an enhanced Alamouti space frequency block decoding scheme for multiple-input multiple-output (MIMO) orthogonal frequency division multiplexing (OFDM) systems over estimated highly frequency selective channels. This method uses the variation of the channel frequency response between each consecutive subcarriers to adapt the Alamouti decoder. Simulation results of DVB-T2 system confirm that this contribution has a good performance in terms of bit error rate when compared to standard Alamouti decoder over known and estimated highly frequency-selective channels such as single frequency network (SFN) channels.

5 Improving the WCIP method by the contour detection technique and analysis of complex structures

Hrizi Hafedh

Abstract :

The wave concept iterative procedure (WCIP) is used to analyze high frequency electronic circuits. It is based on the concept of waves in the place of electromagnetic fields. To study the electronic circuits having complex structures, this method requires much time. In this paper, we improve the convergence of the WCIP method by adding a new algorithm based on the technique of image contour detection. That's why the structure of the studied circuit is considered as an image. The objective is to reduce computing time by reducing dimensions of the calculation matrices. The reduced matrices are built containing only the important part of the information. Our goal is to prove that the most important zones in the structure are located in the contour with small steps in the vicinity of the contour.

Session 3B-2: Hardware Implantation
 Sunday AM, March 18, 2012, Room B
 Chair: Rached Tourki; Co-chair: Singh SANJEEV

58	Simple power analysis attack on smart card	Noura Benhadjoussef and Hassen Mestiri
<p>Abstract :</p> <p>Smart cards are small, portable and tamper-resistant computers. Their uses include security applications ranging from identification and access control to payment systems and wireless communication framework. A secure smart card has to assurance that secret data like cryptographic key cannot be recovered or modified by an attacked entity. The purpose of this paper is the implementation of an authentication protocol on smart card and the analysis of the consumption of this protocol by the Simple Power Attack techniques. (SPA)</p>		
59	Implementation of Secured AES Design in CMOS Technology	Hassen Mestiri, Noura Benhadjoussef and Mohsen Machhout
<p>Abstract :</p> <p>The Advanced Encryption Standard (AES) has been thoroughly studied by designers with the goal to improve the performances of the AES encryption design in terms of area, frequency and power consumption. In this paper, we present the implementation details of the AES encryption 128-bit and the SubBytes transformation. The SubBytes transformation can be implemented using composite field arithmetic in $GF((24)2)$, $GF(((22)2)2)$ and a multi-stage PPRM architecture. The AES algorithm is implemented using 0.18μm 1.8V Complementary Metal Oxide Semiconductor (CMOS) technology. A low power consumption of 24.92 μW at 10 MHz was achieved for multi-stage PPRM architecture for SubBytes transformation.</p>		
61	A Hardware implementation of AES-128 on Virtex-5 FPGAs based on different Subbyte architecture	Nahed Aouf, Mohsen Machhout and Rached Tourki
<p>Abstract :</p> <p>One of the best existing symmetric security algorithms is the Advanced Encryption Standard (AES). The three major optimization goals are: frequency, power consumption and occupation. In this paper we implement an AES pipelined architecture on a single chip of Xilinx Virtex-5(XC5VLX50FFG676-1) FPGA. Also, we compare three different kind of SubByte implementations as known: the look up table (LUT), $GF(24)2$ finite field decomposition and the Positive Polarity Reed-Muller (PPRM), in order to choose the best architecture.</p>		

Poster Session

Session 1 Friday March 16 , 2012 Chair: Hatem BOUJEMAA Co-chair: Fethi TLILI		
3	Performance Analysis of a Reactive Routing Protocol for Mobile Ad hoc Networks	Maher Heni and Ridha Bouallegue
Abstract : Actually there are much increasing research interest in routing protocols for Mobile Ad Hoc Networks (MANET). This interest is the result of the aim to optimize resource consumption, since they present a critical factor in ad-hoc networks. Works on these protocols focus on protocols behavior modification and performances evaluation in order to reduce consumption of resources. The aim of this work is to evaluate the performances of a reactive routing protocol over mobile Ad hoc Networks called AODV. Computer simulation results show the efficiency of the method and also offer performance measures that agree with competitive methods. The study is conducted over various network topologies and also various terminals mobility mode. In addition various metrics are used for this performance measure mainly: End-to-End Delay, Packet loss, Packet Delivery Ratio and Routing Overhead metric. We also show the robustness of AODV against the terminals mobility and the network size.		
6	Possibilistic Localization of Mobile Source	Khaoula Baabou, Souhir Fterich and Hedi Sakli
Abstract : In order to locate a mobile source in a cellular network, the fusion information is proposed here as an interesting solution to synthesize data. This approach is increasingly playing an important role in many areas. Many variations are held including the Possibility theory, the subject of our paper, which we are going to show its use in determining the location of any customer accessing a network. The results would have to properly reflect these characteristics.		
20	Synthesis of Phased Cylindrical Arc Antenna Arrays Using Taguchi Method	Amor Smida, Nadhem Nemri, Ridha Ghayoula and Ali Gharsallah
Abstract : This paper describes a new approach to synthesize cylindrical antenna arrays controlled by the phase excitation, to synthesize directive lobe based on Taguchi method. The proposed method is based on iterative minimization of a function that incorporates constraints imposed in each direction. The results obtained are validated by this method on cylindrical arc Antenna Arrays, which is simulated by CST Microwave. An 8-element cylindrical arc antenna has been simulated with CST Microwave and tested for various types of beam configurations.		
35	Analytical Butterworth-Van Dyke Model of a Ladder BAW Filter	Mohamed Ali Boujemaa, Mohamed Mabrouk and Fethi Choubani
Abstract : Bulk Acoustic Wave (BAW) filters are specify high Q-factor, high power, integrated RF filters which have proven to be an excellent substitute		

for conventional RF filters. In this paper, the Butterworth-Van Dyke model is used to model a ladder BAW filter. In order to validate the model, the analytical results have been compared to the numerical simulation results obtained using the Advanced Design System (ADS). The comparison shows that the simulation and analytical model's outputs are almost identical.

39	Miniature and Improved Isolation of a 3*3 MMO antennas based on Split Ring Resonator array	Aouadi Belgacem, Labidi Mondher and Belhadj Tahar Jamel
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Abstract :
 In this paper, we study the behavior of a 3*3 Multi-Input Multi-Output (MIMO) antennas like the size and the isolation between the three radiating elements with and without SRR.

47	Effect of the high impedance surface on the conformal antenna	Khaled Jerbi, Mohamed Glaoui and Ali Gharsallah
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Abstract :
 we propose to study through this example the influence of high-impedance surface on the inter-element coupling to an conformal antenna. In the first part, we present the conformal antenna design and its various characteristics. In the second part, we present the properties of and the geometry of the high impedance surface with vias (Vertical Interconnect Access) that we will use. At the end we will present the architecture of the antenna with HIS and the result of simulation with CST Microwave and reduced inter-element coupling.

Session 2

Saturday March 17 , 2012

Chair: Mohamed SIALA; Co-chair: Sofiane CHERIF

11	A New Scheduling Algorithm For Resource Allocation in LTE Femtocell Networks	Kaouthar Sethom, Aicha Ben Salem and Ridha Bouallegue
<p>Abstract :</p> <p>Radio Resource Management (RRM) is one of the most challenging and one of the most important aspects of modern wireless communication networks such as Femtocells. System performance can be improved by applying intelligent radio resource management scheme in wireless networks. In this paper a new scheduling algorithm based on cooperative game theory is proposed to improve users QoS with respect to its access priority in LTE Femtocell networks. Each individual user's goal is to maximize the benefit i.e. the allocated bandwidth</p>		
32	Scheduling Schemes Performance Analysis in the LTE-Advanced System with Carrier Aggregation	Marwane Ben Hcine and Ridha Bouallègue
<p>Abstract :</p> <p>Carrier Aggregation is the one of the most distinct features of LTE-Advanced. It allows bandwidth extension up to 100 MHz. The use of the appropriate user scheduling scheme assuming different carrier aggregation deployment scenarios is necessary to assure better system performances and optimal use of resources. Assuming carrier aggregation, there are two straightforward scheduling schemes: Separated Random User Scheduling Scheme (SRUS) and Joint User Scheduling Scheme (JUS). First one has simple implementation since it need user equipment to be configured with only one component carrier (CC). The second need user equipment to be configured with multiple component carriers. It is optimal in performance but with high complexity.</p> <p>In this paper, we will study the performance of both scheduling schemes in three deployment scenario: identical coverage, diverse coverage and main beam directed at sector boundaries. The aim of our study is to determine the appropriate scheduling scheme for each deployment scenario. Results show that in diverse coverage ad main beam directed at sector boundaries JUS scheme perform better than SRUS, which can justify the extra control signaling overhead and intensive use of user equipment power. In identical coverage deployment scenario, JUS performances are close to SRUS performances.</p>		
60	Blind CFO estimation for OFDM-IDMA system in Rayleigh fading multipath channel	Zrelli Yasamine, Houcke Sébastien, Langlais Charlotte and Ammar Mahmoud
<p>Abstract :</p> <p>We address the problem of carrier frequency offset (CFO) in Orthogonal Frequency Division Multiplexing (OFDM) communications systems in the context of Interleaved Division Multiple Access (IDMA).We propose a technique to adapt a method of blind CFO estimation, called CFO estimation-Syndrome Function Minimization (C-SFM), to the context of a system combining IDMA and OFDM where a quasi-static Rayleigh fading multipath channel is considered. Performance in terms of Mean Squared Error (MSE) of carrier frequency offset is studied for a different</p>		

number of users. In order to evaluate the robustness of the C-SFM method, we compare the performance of OFDM-IDMA system using C-SFM technique with that of a perfect synchronous system. Our results show that, for high E_b/N_0 , the two systems have the same performance.

64 Architecture Of Metadata Spatio-Temporal Real-Time For Wireless Sensor

Walid Fantazi and Tahar Ezzdine

Abstract :

The information systems containing sensors are more and more used in many applications like the monitoring of the environmental phenomena (temperature, pressure, humidity, level of CO₂, etc). The data gathered by these sensors are space-time data relating to the phenomena observed thus that the elements to measure. Within the framework of this article we developed an approach for the installation of a communicating space-time database with an application (Web mapping) which satisfies the needs of users for the management (structuring and the exploitation) of space-time data within databases sensors. Thus, and according to the data necessary during a time interval and integrated in the database, the developed interface will make it possible to reach and handle the data, like ordering the operation of the sensors in real-time. This approach will be applied in the environmental field.

65 Tunable RF Bandpass Filter using Loaded Square Ring Resonator

Bousbia Leila and Mohamed Mabrouk

Abstract :

In this work, the design procedure, modeling and implementation of reconfigurable filters based on coupled open loop rings resonators is presented. A tunable band-pass filter capable of controlling center frequency bandwidth and selectivity is proposed. The device is tuned by varactor diodes placed at the inner of the open loop ring resonator. Our Simulations show a tunable center frequency range from 2.2GHz to 2.43 GHz, a tunable fractional bandwidth range from 11.36% to 14.81%, and a tunable selectivity range from 0.36 to 0.7.

8	Novel Timing Acquisition Approach for UWB Systems	Moez Hizem and Ridha Bouallegue
<p>Abstract :</p> <p>In this paper, the goal is to investigate the timing acquisition problem for ultra wideband (UWB) systems using time hopping (TH) spreading. Low-complexity timing acquisition represents a main challenge to achieve the high potential UWB technology expectations for indoor wireless communication. For this reason, to address this constraint, we propose and test a new timing acquisition algorithm based on two-stage acquisition scheme. Applied in [1-4], our algorithm is a combination between coarse synchronization based on timing with dirty templates (TDT) acquisition scheme and a new fine synchronization algorithm which conduct to an improved estimate of timing offset. We develop this method in both data-aided (DA) and non-data-aided (NDA) modes. Simulation results show a significant performance improvement in the NDA mode and a small one in the DA mode. These results are realized in terms of the main square error (MSE) and especially in the acquisition probability, comparing to the original TDT approach in which the performance degrades to the random symbol effect.</p>		
22	Contribution to the optimization of Point-to-Point Systems MIMO Performance with Partial Channel State Information	Rajoua Anene and Ridha Bouallegue
<p>Abstract :</p> <p>The main purpose of this paper is to study the performance of the Multiple-input multiple-output (MIMO) wireless communication. MIMO Systems have the potential to provide high data rates, the evolution of these systems builds upon the ability to furnish high rates with the channel state information at the transmitter (CSIT), even if obtaining CSIT is a complex task because the resources on the feedback link is very limited. Therefore, we propose to study the optimization of MIMO wireless communication systems with partial channel state information. In this paper we propose techniques to exploit the available sources of CSIT in order to optimize the system performance. Firstly, point-to-point MIMO channels are considered for the aim of error rate minimization. Secondly linear precoding techniques are proposed to enhance the performance of space-time coded (STC) MIMO systems, based on statistical information on the MIMO channel. Computer simulations show that, the performance of such systems can be ameliorates by appropriately combining mean and covariance information.</p>		
33	BER PERFORMANCE OF NEURAL NETWORK COMPENSATOR IN FREQUENCY DOMAIN BASED MMSE RECEIVER FOR HPA NONLINEARITY IN MIMO OFDM SYSTEMS	Maha Cherif Dakhli, Rafik Zayani and Ridha Bouallegue
<p>Abstract :</p> <p>In this paper, we present a method based on Neural Network (NN) technique in frequency domain and accompanied with MMSE(Minimum Mean Square Error), which corrects at the receiver level, the Non-linear (NL) distortions due to HPA (High Power Amplifier). The neural network</p>		

consists on a feed-forward Multi-Layer Perceptron (MLP) associated with Levenberg)Marquardt learning algorithm. The results show a BER performance of neural network compensator in frequency domain in a VBLAST MIMO OFDM (Vertical Bell Layered Laboratories Space-Time Multiple-Input Multiple-Output Orthogonal Frequency Division Multiplexing) system running under a Rayleigh fading channel.

42	RECEIVER TECHNIQUE FOR THE COMPENSATION OF HPA NONLINEARITY IN STBC BASED COOPERATIVE AMPLIFY-AND-FORWARD OFDM SYSTEMS	Hela Hizaoui, Rafik Zayani, Ridha Bouallegue
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Abstract :
 In this paper, we investigate the effects of high-power amplifier (HPA) nonlinearity on the performance of wireless multiple antenna orthogonal frequency-division multiplexing (MIMO-OFDM) systems, especially for the Alamouti Space Time Block Coding (STBC) case.
 We propose a compensation method for this nonlinearity at the receiver side. The performance of the cooperative STBC-MIMO-OFDM system equipped with the proposed compensation schema is evaluated in terms of Bit Error Rate (BER) when transmissions are performed over uncorrelated Rayleigh fading channels. Numerical results are validated by MATLAB simulation and show the high improvements in terms of BER especially for high SNR values.

49	Mobile Localization Using Channel Impulse Response Fingerprinting And Neural Networks	Raida Zouari, Rafik Zayani and Ridha Bouallegue
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Abstract :
 In recent years, there has been a growing interest in the mobile network for a variety of interior applications such as the location of people in confined spaces and underground. Indeed, the location of people, mobile terminals and equipment is most desirable for security and operational enhancements in mining. Due to the special nature of underground environments, traditional localization techniques based on RSS, AOA, TOA and TDOA cause in the deterioration of the positioning performance. In this paper, we study a method for mobile localization which combines Channel Impulse Response (CIR) fingerprinting and Neural Network (NN) techniques.

Contact

Takwa BOUALLEGUE

Phone : +(216) 55 40 45 19

e-mail : bouallegue.takwa@gmail.com

www.6tel.org / www.innov-com.org