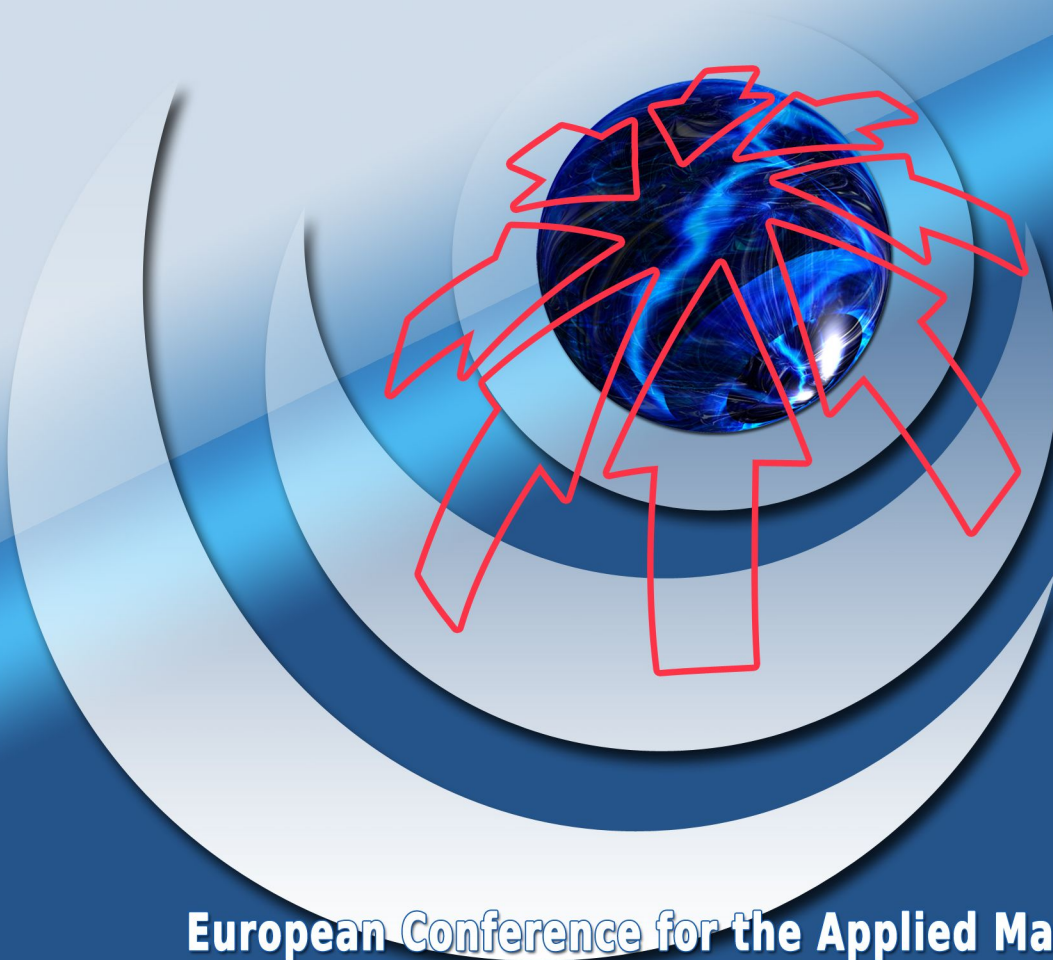


Editors: Nikos Mastorakis, Valeri Mladenov,
Metin Demiralp, Zoran Bojkovic

Applied Mathematics & Informatics

Applied Mathematics & Informatics



**European Conference for the Applied Mathematics
and Informatics**

Vouliagmeni, Athens, Greece, December 29-31, 2010

ISSN: 1792-7390

ISBN: 978-960-474-260-8

APPLIED MATHEMATICS and INFORMATICS

**European Conference for the APPLIED MATHEMATICS and
INFORMATICS**

**Vouliagmeni, Athens, Greece
December 29-31, 2010**

ISSN: 1792-7390
ISBN: 978-960-474-260-8

APPLIED MATHEMATICS and INFORMATICS

**European Conference for the APPLIED MATHEMATICS and
INFORMATICS**

**Vouliagmeni, Athens, Greece
December 29-31, 2010**

Copyright © 2010, by WSEAS Press

All the copyright of the present book belongs to the World Scientific and Engineering Academy and Society Press. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the Editor of World Scientific and Engineering Academy and Society Press.

All papers of the present volume were peer reviewed by two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.
See also: <http://www.worldses.org/review/index.html>

ISSN: 1792-7390
ISBN: 978-960-474-260-8

European Society for Applied Mathematics - EuroSAM

APPLIED MATHEMATICS and INFORMATICS

**European Conference for the APPLIED MATHEMATICS and
INFORMATICS**

**Vouliagmeni, Athens, Greece
December 29-31, 2010**

Editors:

Prof. Nikos Mastorakis, Technical University of Sofia, BULGARIA

Prof. Valeri Mladenov, Technical University of Sofia, BULGARIA

Prof. Metin Demiralp, Istanbul Technical University, TURKEY

Prof. Zoran Bojkovic, University of Belgrade, SERBIA

International Program Committee Members:

Ahmed Boutejdar, GERMANY

Ayoubal-Hamadi, GERMANY

Olga Martin, ROMANIA

Panos Pardalos, USA

Kabir Mashud, GERMANY

Ronald Yager, USA

Amauri Caballero, USA

Nikos Mastorakis, BULGARIA

Mueller Soeren, GERMANY

George Vachtsevanos, USA

Robert Finkel, USA

Demetrios Kazakos, USA

Zhiqiang Gao, USA

Boutejdar Ahmed, GERMANY

Cayrel P-Louis, GERMANY

Yan Wu, USA

Spyros Tragoudas, USA

Arkady Kholodenko, USA

Gregory Baker, USA

Theodore Trafalis, USA

Takis Kasparis, USA

Galigekere Dattatreya, USA

Caroline Sweezy, USA

Asad Salem, USA

Dian Zhou, USA

Thimm Heiko, GERMANY

Daowen Qiu, CHINA

Metin Demiralp, TURKEY

Kleanthis Psarris, USA

Andrew D. Jones, USA

Valeri Mladenov, BULGARIA

Neri F., ITALY

Chen S. Y., P. R. CHINA

Shyi-Ming Chen, R. O. C.

Yen K., USA

Rong-Jyue Fang, TAIWAN

Argyrios Varonides, USA

Nikolai Kobasko, USA

Xu Anping, P. R. CHINA

Zhu H., JAPAN

Table of Contents

Plenary Lecture 1: Density and Approximation by Radial Basis Functions	10
<i>Vitaly Maiorov</i>	
Steganosis Using Wavelets Conditional Probability and Primitive Polynomials	11
<i>E. A. Yfantis</i>	
Synchronizing Brazilian Sign Language (LIBRAS) on videos for Open Digital TV with Educational Purposes	18
<i>Celso S. Oliveira, Edson Benedito Dos Santos Jr, Hilda C. De Oliveira</i>	
Some Causal Connections Between Stochastic Dynamic Systems	24
<i>Ljiljana Petrovic</i>	
Mechanical Vibration Analysis Using Maple	32
<i>William F. Sanchez Cossio</i>	
A Visual Compass Based on UKF SLAM	38
<i>Jae-Seong Han, Sang-Moo Lee, Sang-Hoon Ji</i>	
Auditory-Visual Speech Recognition Error Detection Using Longest Common Subsequence Matching of Vowel Sequences	45
<i>Woohyun Ko, Kwanghee Lee, Seungjoon Lee, Sangmoo Lee</i>	
A New Hybrid Evolutionary Algorithm for Job-shop Scheduling Problems	51
<i>Sohrab Khanmohammadi, Hamed Kharrati</i>	
An Efficient Approach to Unit Commitment Using Basic Specifications of Units	57
<i>Sohrab Khanmohammadi, Mohsen Amiri</i>	
Optimal Resource Allocation in Data Envelopment Analysis	65
<i>Alireza Amirteimoori, Sohrab Kordrostami, Nazanin Moradmand</i>	
On the Method of Additional Conditions for the Laplace Equation in an Angle	70
<i>Igor Neygebauer</i>	
Modeling the Behavior of Cooperative Material Handling Robots	76
<i>P. Esmaili, S. Khanmohammadi</i>	
Automatic Breast Cancer Detection Methodology Using Artificial Neural Networks	82
<i>Malik Braik, Alaa Sheta, Sultan Al-Jahdali</i>	
The Proposed Neural Networks Navigation Approach	88
<i>Hachour Ouarda</i>	
A Novel Technique for Visualization Electrical Activities in the Brain during Epileptic Seizure	94
<i>Amidora Idris, Tahir Ahmad, Normah Maan</i>	

A Multi-Objective Performance Evaluation in Grid Task Scheduling Using Evolutionary Algorithms	100
<i>Miguel Camelo, Yezid Donoso, Harold Castro</i>	
Lyapunov Exponents and Generalized Spectral Radius	106
<i>A. Czornik, A. Nawrat</i>	
Computational Support of the Laboratory Identification of Thermal Technical Characteristics of Building Materials	112
<i>Jiri Vala</i>	
Application of He's Variational Iteration Method and Adomian Decomposition Method to Solution for the Fifth Order Caudrey–Dodd–Gibbon (CDG) Equation	118
<i>Mehdi Safari</i>	
Physical Analysis and Mathematical Considerations of an Electromechanical System: Arm-Mobile Platform	126
<i>J. Alejandro Betancur</i>	
A Method to Fit Quasi-Periodical Curve to NDVI Provided by Terra/MODIS	132
<i>Masao Igarashi, Haruka Shiotani, Eiji Nunohiro, Jong Geol Park</i>	
Providing Data Integrity for Distributed Environment	137
<i>Jaechun No</i>	
A Design for Hybrid File System	143
<i>Jaechun No</i>	
Design and Implementation of Cryptographic Modules on FPGAs	149
<i>Mihai Togan, Adrian Floarea, Gigi Budariu</i>	
An Efficient Sweeping Strategy for Swarm Robots	155
<i>Jeong-Seop Park, Sang-Moo Lee, Woong-Hee Shon, Myo-Taeg Lim</i>	
A Java Implementation of a Question Answering System based on Conditional Knowledge in Client-Server Technology	162
<i>Cristina Tudorache Zamfir</i>	
A New Computer-based Test System: An Innovative Approach in E-learning	168
<i>Maha E. K. Al Sadoon, Rasha S. Abdul Wahhab</i>	
Hesyan Functions	174
<i>Saeid Ghasrdashti, Saeid Davar</i>	
Labelled Stratified Graphs can Generate Formal Languages	184
<i>Tudor Preda Irina-Valentina</i>	
Input Shaping Command to Reduce Residual Vibration of Payload Having Multi Degree of Oscillation	190
<i>D. Kim, K. T. Nam, S. M. Lee</i>	
Characterization of Graphene Structures Using the Tutte Polynomial with Maple and Sage	195
<i>David Alberto Bolivar Ruiz</i>	

Mathematical Models and Numerical Analysis of the Conduction and Valence Band Eigenenergy in Cylindrical Quantum Dots	201
<i>Sanjay Prabhakar, Eduard Takhtamirov, Roderick Melnik</i>	
Hash Value Delay Hiding for Image Authentication	207
<i>Jean Y. Song, Honglin Jin, Yoonsik Choe</i>	
About Uniform Estimates of Solutions to the Third Order Nonlinear Autonomous Differential Equation	213
<i>I. V. Astashova</i>	
Using Regularization Ratios for the Reconstruction of Objects from Real Data	219
<i>Koung Hee Leem, George Pelekanos</i>	
AES on GPU Using CUDA	225
<i>Tomoiaga Radu Daniel, Stratulat Mircea</i>	
Interactive Parallel and Distributed Processing	231
<i>Luigi Pagliarini, Henrik Hautop Lund</i>	
Robotic Art for Wearable	239
<i>Luigi Pagliarini, Henrik Hautop Lund</i>	
Authors Index	247

Plenary Lecture 1

Density and Approximation by Radial Basis Functions



Professor Vitaly Maiorov

Abstract: We characterize the radial basis functions whose scattered shifts form a fundamental system in the space $L_p(\mathbb{R}^d)$. In particular, we show that for any even function h from the space $L_2(\mathbb{R}, \mu)$, the space formed by all possible linear combinations of shifted radial functions $h(\|x + a\|)$, $a \in \mathbb{R}^d$, is dense in the space $L_p(\mathbb{R}^d)$, $1 \leq p \leq 2$, if and only if the function h is not a polynomial. The problems of approximation by radial basis functions also are discussed.

In order to obtain our results we make use of methods of harmonic analysis on the unit ball B^d which are based on a combination of methods of harmonic analysis on the unit sphere \mathbb{S}^{d-1} and the unit segment $\mathbf{U} := [-1, 1]$. Using an orthogonal basis of spherical harmonics on \mathbb{S}^{d-1} and the Gegenbauer basis of orthogonal polynomials on the segment \mathbf{U} we construct a new basis $\mathbf{P} = \{P_n\}$ ('convolution' of bases on \mathbb{S}^{d-1} and on \mathbf{U}) consisting of orthogonal polynomials on the ball B^d . The peculiarity of the basis \mathbf{P} is that the moments $M_\alpha(g, a) := \langle g_a, P_n \rangle$ of radial functions of the form $g_a = g(\|x + a\|)$ in some sense allow for a separation of the variables g and a . That is, we represent them by the finite sum $M_\alpha(g, a) = \sum_k u_k(g)v_k(a)$, where $u_k(g)$ are a linear functionals of g and $v_k(a)$ are a functions on \mathbb{R}^d .

Authors Index

Ahmad, T.	94	Leem, K. H.	219
Al Sadoon, M. E. K.	168	Lim, M.-T.	155
Al-Jahdali, S.	82	Lund, H. H.	231, 239
Amiri, M.	57	Maan, N.	94
Amirteimoori, A.	65	Melnik, R.	201
Astashova, I. V.	213	Moradmand, N.	65
Betancur, J. A.	126	Nam, K. T.	190
Braik, M.	82	Nawrat, A.	106
Budariu, G.	149	Neygebauer, I.	70
Camelo, M.	100	No, J.	137, 143
Castro, H.	100	Nunohiro, E.	132
Choe, Y.	207	Oliveira, C. S.	18
Cossio, W. F. S.	32	Ouarda, H.	88
Czornik, A.	106	Pagliarini, L.	231, 239
Davar, S.	174	Park, J. G.	132
De Oliveira, H. C.	18	Park, J.-S.	155
Donoso, Y.	100	Pelekanos, G.	219
Dos Santos Jr, E. B.	18	Petrovic, L.	24
Esmaili, P.	76	Prabhakar, S.	201
Floarea, A.	149	Ruiz, D. A. B.	195
Ghasrdashti, S.	174	Safari, M.	118
Han, J.-S.	38	Sheta, A.	82
Idris, A.	94	Shiotani, H.	132
Igarashi, M.	132	Shon, W.-H.	155
Ji, S.-H.	38	Song, J. Y.	207
Jin, H.	207	Stratulat, M.	225
Khanmohammadi, S.	51, 57, 76	Takhtamirov, E.	201
Kharrati, H.	51	Togan, M.	149
Kim, D.	190	Tomoiaga, R. D.	225
Ko, W.	45	Tudor, P. I.-V.	184
Kordrostami, S.	65	Vala, J.	112
Lee, K.	45	Wahhab, R. S. A.	168
Lee, S.	45	Yfantis, E. A.	11
Lee, S.-M.	38, 45, 155	Zamfir, C. T.	162
Lee, S.-M.	190		