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RECENT ADVANCES in ELECTRIC POWER SYSTEMS, HIGH VOLTAGES, ELECTRIC MACHINES

Recent Advances in Electrical Engineering
A series of Reference Books and Textbooks

Proceedings of the 8th WSEAS International Conference on ELECTRIC POWER SYSTEMS, HIGH VOLTAGES, ELECTRIC MACHINES (POWER '08)

VENICE, ITALY, NOVEMBER 21-23, 2008

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Preface

This book contains the proceedings of the 8th WSEAS International Conference on ELECTRIC POWER SYSTEMS, HIGH VOLTAGES, ELECTRIC MACHINES (POWER '08) which was held in Venice, Italy, November 21-23, 2008. This conference aims to disseminate the latest research and applications in Generation, Transmission & Distribution Planning, Transmission & Distribution Equipment, Electricity Demand Management, Control Strategies, Environmental Issues and Impacts, SCADA/EMS and Information Systems, Power Electronics Applications, Thermal Power and other relevant topics and applications.

The friendliness and openness of the WSEAS conferences, adds to their ability to grow by constantly attracting young researchers. The WSEAS Conferences attract a large number of well-established and leading researchers in various areas of Science and Engineering as you can see from **http://www.wseas.org/reports**. Your feedback encourages the society to go ahead as you can see in **http://www.worldses.org/feedback.htm**

The contents of this Book are also published in the CD-ROM Proceedings of the Conference. Both will be sent to the WSEAS collaborating indices after the conference: **www.worldses.org/indexes**

In addition, papers of this book are permanently available to all the scientific community via the WSEAS E-Library.

Expanded and enhanced versions of papers published in this conference proceedings are also going to be considered for possible publication in one of the WSEAS journals that participate in the major International Scientific Indices (Elsevier, Scopus, EI, ACM, Compendex, INSPEC, CSA .... see: www.worldses.org/indexes) these papers must be of high-quality (break-through work) and a new round of a very strict review will follow. (No additional fee will be required for the publication of the extended version in a journal). WSEAS has also collaboration with several other international publishers and all these excellent papers of this volume could be further improved, could be extended and could be enhanced for possible additional evaluation in one of the editions of these international publishers.

Finally, we cordially thank all the people of WSEAS for their efforts to maintain the high scientific level of conferences, proceedings and journals.

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Keynote Lecture

Multivariate Data Completion or Addition on a Single Curve Representation of a Hyperrectangulargrid via Fluctuation Suppression

Professor Metin Demiralp
Istanbul Technical University, Informatics Institute,
Group for Science and Methods of Computing,
Istanbul, TURKIYE

Abstract: This work is somehow about multivariate interpolation. If an N–variate function is given at certain points of the cartesian space of the N independent variables and its value at a point which is outside the data given points is sought then various methods available in the literature can be used to find this value. However, there is almost no unique universal way to do so and each method has its own capability, efficiencies, deficiencies and pitfalls. Data completion and data mining techniques can also be considered amongst them.

The work focuses on a finite hypergrid in N–dimensional cartesian space first and then a multivariate function's values are assumed to be given at certain nodes (we call them full nodes) of this grid. The next step is the dimension reduction. To this end we construct a single continuous curve passing through all nodes of the grid with respect to an appropriately chosen ordering. Curve construction is not unique and depends on the ordering of the nodes. It is better to choose the curves whose mathematical definitons are rather simple. This construction leaves us to use just a single parameter to specify any location on the curve. Although the nodes are defined as N tuples in the N–dimensional cartesian space their locations can also be given in terms of the curve parameter. Hence, the data completion or addition problem is converted to a univariate interpolation which is rather simple.

The full nodes are now represented by ordered pairs whose first elements are the position parameter values on the constructed curve while the second elements are the multivariate function's values at those points. Data completion (to inject one or a few missing data to a data set which is almost full everywhere) or data addition (to evaluate the function's value at an empty node within a sparsely data given hypergrid) then becomes to seek the multivariate function's value at a specified node which corresponds to a unique position on the curve.

There are a lot of univariate interpolation methods, each of which can be used for the interpolation on the curve defined above depending on the nature of the demands and produces some unavoidable errors. Quite recently a new method of interpolation is developed by Demiralp. It uses the Fluctuationlessness Theorem (conjectured and proven by Demiralp recently). Theorem dictates us that the matrix representation of a function over a subspace of the Hilbert space for analytic and square integrable functions is equal to the image of the independent variable's matrix representation on the same subspace under the same function as long as the fluctuation terms (differences between the means of specified powers of the independent variable and the same specified power of the mean of the independent variable). This fact can be used to approximate an integral and a quadrature like formula (the linear combination of the function values at certain points with positive linear combination coefficients (we call weights) can be obtained. The quality of the approximation depends on the dimension of the subspace mentioned above and becomes better as the dimension increases. Hence the two sufficiently high consecutive dimension will give the same value for the integration under consideration within a prescribed accuracy.

The integrand of the abovementioned integral is chosen in such a way that it becomes a linear combination of given values of the multivariate function for, say, n dimensional subspace while the same value is expressed as another linear combination of the given function values and the single sought values of the same function for the (n + 1) dimensional subspace. Since these two expressions should produce the same value it is possible to extract the sought value of the function under consideration. Presentation will focus on these topics and certain remarks.

Acknowledgment:
Author is grateful to Turkish Academy of Sciences for its support.

Brief Biography of the Speaker: Metin Demiralp was born in Turkey on 4 May 1948. His education from elementary school to university was all in Turkey. He got his BS, MS, and PhD from the same institution, Istanbul Technical University. He was originally chemical engineer, however, through theoretical chemistry, applied mathematics, and computational science years he is working on methodology for computational sciences. He has a group (Group for Science and Methods of Computing) in Informatics Institute of Istanbul Technical University (he is the founder of this institute).

He collaborated with the Prof. H. A. Rabitz's group at Princeton University (NJ, USA) at summer and winter semester breaks during the period 1985--2003 after his 14 months long postdoctoral visit to same group in 1979--1980.

Metin Demiralp has roughly 70 papers in well known scientific journals and is the full member of Turkish Academy of Sciences ince 1994. He is also a member of European Mathematical Society and the chief--editor of WSEAS Transactions on Mathematics currently. He has also two important awards of Turkish scientific establishments.

Plenary Lecture I

The Experimental Determination and Numerical Simulation of the Dynamic Insulation of a Large Consumer Unit

Professor Flavius Dan Surianu
Faculty of Electrical and Power System Engineering
Politehnica University of Timisoara
flavius.surianu@et.upt.ro

Abstract: The dynamic processes of power systems represent a dangerous but fascinating problem and knowing them precisely in order to prevent or reduce their consequences is a real challenge for specialists. Due to their unpredictability, it is difficult to get them known and thus mathematical simulation is necessary. It is a very useful instrument, but it requires a very careful choice of the simplifying hypotheses and an experimental testing of the results. This is the topic of the lecture. It presents a mathematical simulation of a steam power plant connected to an electric network supplying a set of consumers. It simulates a dynamic insulation process of a large industrial consumer through its sudden disconnection from the power system. The evolution of the insulation is followed through until its post emergency stability state is reached. The results are then compared with those of an insulation of a large industrial consumer equipped with its own power source - The Integrated Iron and Steel Work- Hunedoara - Romania. The comparison has led to the validation of the mathematical simulation. It has become a very useful instrument for studying the dynamic regimes and the determination of critical states of power systems.

Brief Biography of the Speaker: Flavius Dan Surianu was born in Timisoara, Romania on April, 2, 1949. He received the B.Sc. and the Ph.D. degrees in electric machines from the Politehnica University of Timisoara, in 1972 and 1987, respectively. Since 1977 he has been devoted to education and research at the Politehnica University of Timisoara where he is a professor in areas of Large Industrial Consumer Units, Identification and Mathematical Modeling of Power System Elements and Electromagnetic Compatibility and he is the head of the Power System Department of the Faculty of Electrical and Power System Engineering. He has a remarkable scientific and didactic experience being the author of 14 books, 66 technical papers and 57 research projects, mainly in the fields of transient and long term dynamics of power systems, mathematical models of large consumer units, high voltage and electromagnetic risk, electromagnetic compatibility and renewable energies.

Plenary Lecture II

Finite Element Method Simulation for Rapid Prototyping

Assoc. Prof. PhD. Eng. Mihaiela Iliescu
"POLITEHNICA" University of Bucharest,
ROMANIA
iomi@clicknet.ro

Abstract: Rapid Prototyping is part of a modern technologies group whose target is to reduce the designing and manufacturing cycle of a product. One efficient rapid prototyping technique is that of 3D printing and, its benefits in designing and manufacturing elements of a laser medical device are presented by this paper. More, a simulation involving computational fluid dynamics (CFD) and heat transfer phenomena, carried out with finite element method, tested the good functional characteristics of the whole laser medical device.

Brief Biography of the Speaker:

a)

- Graduated in 1989, "POLITEHNICA" Institute of Bucharest – Machine Building Technology Department, won best student award; Worked as an engineer – in the Design Department of a Romanian peripheral equipment factory, FEPER, in 1989 – 1991.
- Since 1991 has been working, as a teacher (Associated Professor, since 2004) in "POLITEHNICA" University of Bucharest, ROMANIA – Manufacturing Department
- Doctoral Thesis, in 2000 – on Quality and Machinability of Thermal Sprayed Layers;
- Took additional Statistic Courses (Basic Concepts in Statistics, Design of Industrial Experiments), with USA universities Professors, in 2006 and 2007 and graduated with mark A.

b) Scientific Activities

- scientific researcher, in about 30 Research Projects and Grants;
- almost, 70 studies and papers - published to International/National Conferences, Sessions, Workshops, Platform Meetings etc.;
- lecturing courses on: Applied Statistics for Engineers; Metal Forming; Manufacturing Technologies; Injection Moulding
- author of 7 books – on Statistics, Manufacturing Technology, Geometrical Precision Inspection
- member of:
  - Manufacturing Engineering Universities Association - AUIF - ROMANIA
  - Economical Engineering Romanian Association - ARIE - ROMANIA
  - Plastics Industry Producers Association – ASPAPLAST –R OMANIA
  - Rapid Manufacturing Association – RAPIMAN (worldwide rapid prototyping and innovative manufacturing joint)

c) WSEAS Activities

- Papers in WSEAS Conferences: Bucharest, June, 2008; Crete, 2008, Rhodos, 2008, WSEAS Journal Transactions on Systems
- organizing activities for WSEAS Conference, Bucharest, June, 2008

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