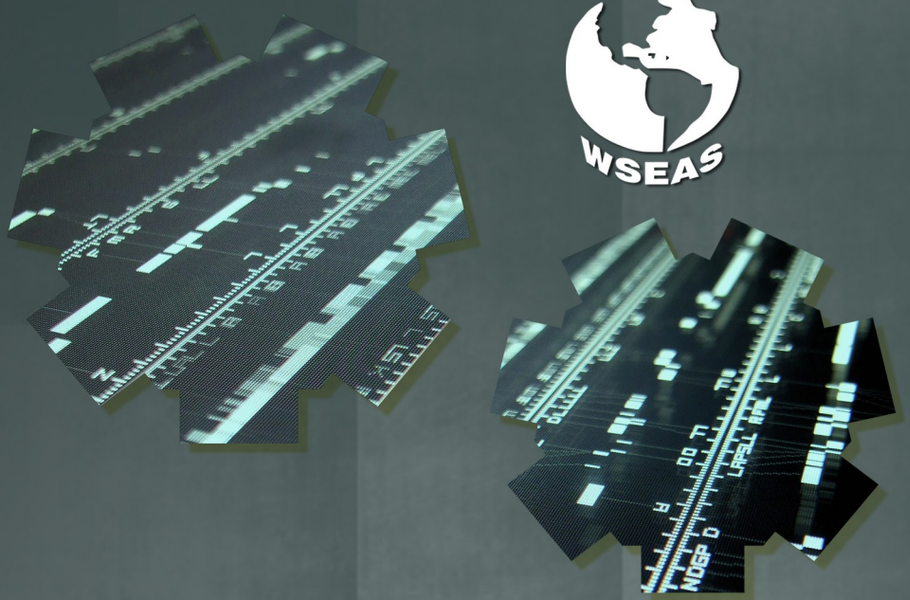
Editors: Nikos E. Mastorakis, Zoran Bojkovic

Recent Researches in Applied Mathematics & Informatics

- Proceedings of the 16th WSEAS International Conference on Applied Mathematics
- Proceedings of the 2nd European Conference for the Applied Mathematics and Informatics

European Society for Applied Mathematics - EUROSAM



Montreux, Switzerland, December 29-31, 2011

ISBN: 978-1-61804-059-6

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www.wseas.org
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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

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World Scientific and Engineering Academy and Society

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Plenary Lecture 1

Relational Algebra Applications in Web Programming

Professor Mirela-Catrinel Voicu
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Abstract: Many websites of e-commerce, e-tourism or other e-activities propose different communication tools to consumer. For example, on the website http://www.booking.com/ the user can perform searches by: country, city, price range per night, period, star rating, hotel type, facilities, hotel theme, district, chains, etc., when it comes to booking hotels rooms. On the website http://www.sarenza.com/ the user can buy shoes selecting the following features: type, brand, size, colour, style, heel, season, material, prix, etc. In the same way, we can recall very popular websites such as http://www.amazon.com/, http://www.treather.com/, http://www.alibaba.com/, etc. and many other worldwide websites.
In our study we are focused on B2C websites and our goal is to provide tools with which the consumer can specify different criteria in order to select products. We consider the case in which the website data are stored in a relational database. Generally, the consumer desired products correspond to records from a query result. Usually, this result table is obtained selecting fields from one or many tables, using table relationships and respecting some criteria. We start from idea that in databases with a very high number of records, when the number of tables used in relationships and the number of criteria are not small, the traditional way used to explore the relational database, in certain situations, cannot be easily implemented. In order to provide a solution to this problem, we propose an algorithm, using concepts from relational algebra. We start from a particular database and we propose some criteria for selection, pointing out some difficulties using traditional algorithm. Afterwards, we present our new algorithm and finally we present a generalization for an abstract case.

Brief Biography of the Speaker:
Mirela-Catrinel Voicu was born in Romania. In 1995, she graduated from the Faculty of Mathematics and Computer Sciences, West University of Timisoara. She received the MSc degree in Applied Mathematics, Informatics in Economy and Computer Sciences from the West University of Timisoara. She followed a training course for PhD thesis at the National Institute for Statistics and Economic Studies, Paris, France. She received her PhD in 2001 from the University of Timisoara, Romania (with the "Cum laude" distinction) and from the University of Paris 13, France (with the "Tres honorable avec felicitations" distinction). Currently she is a Professor at the Department of Economic Informatics, within the Faculty of Economics and Business Administration, West University of Timisoara, Romania, where, since 1995, she has held several academic positions. Her activity includes Programming and Internet Programming, Informatics in Economy, Databases, OOP, Data structures. Through the collaboration program between the Faculty of Economics and Business Administration and the Faculty of Mathematics and Informatics of the West University, she has held classes with international participation, in postgraduate education, in the section of "Mathematic modelling in economics and applied sciences" Exchange Rate Evolution Models subject introduced within the program due to the original contributions in her PhD. During the collaboration between the Faculty of Economics and Business Administration, West University of Timisoara and CUOA Italy, she has taught a postgraduate class for the section of "Management of Business and Public Administration", regarding the Internet. She has 79 papers in conference proceedings or refereed journals (from these papers, 26 have been presented or published abroad). She has published 8 books (1 book in France, 1 book in Germany and 6 books in Romania). She is a reviewer and a member in international program committee of various WSEAS conferences from abroad, reviewer at "Journal of Knowledge, Communications and Computing Technologies", member in the teams of 9 research projects (one of which is international) and project manager for one research project. Since 2002, she is a member of INFOREC (Romanian Association for Economic Informatics Training Promotion), since 2005, she is a member of WSEAS (World Scientific and Engineering Academy and Society) and since 2009, she is a member of SCT (Society for Computing Technologies).

Plenary Lecture 2

Analytical solutions of eddy current problems for media with varying electric and magnetic properties

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Abstract: In many industrial processes the electric and magnetic properties of a conducting medium can vary with respect to geometrical coordinates. Examples include surface hardening, decarbonization and other applications. Mathematical models for the analysis of electrically conducting media with varying electric conductivity and magnetic permeability have to be developed in order to take into account variability of the properties of the medium.
Analytical solutions of eddy current problems for electrically conducting media with constant properties are well-known in the literature. The focus in the present talk is on the cases where the magnetic permeability and electric conductivity of the medium depend on one geometrical coordinate (vertical coordinate in the case of a multilayer planar medium or radial coordinate in the case a mutlilayer tube). Examples of spherical geometry will be discussed as well.
There are at least two basic methods that are used to model eddy current problems for media with varying properties. First, one can use the solutions for multilayer medim with constant properties assuming that the change in electric conductivity and/or magnetic permeability is represented by piecewise constant functions. However, rapid changes in the properties of each layer may require to use many layers. Second, analytical solutions can be constructed by selecting a relatively simple one- or two-parameter families of electic conductivity and magnetic permeability profiles (in the form of an exponential or power function). Experimental data confirm that such approximations are reasonable.The solution to the Maxwell's equations in these cases can be obtained in closed form in terms of known special functions. Examples of using the second approach will be discussed.

Brief Biography of the Speaker:
Andrei Kolyshkin received his undergraduate degree in Applied Mathematics in 1976 at the Riga Technical University. In 1981 he received a Ph.D in differential equations and mathematical physics at the University of St. Petersburg (Russia). Andrei Kolyshkin is currently a full professor at the Department of Engineering Mathematics at the Riga Technical University. His current research interests include investigation of stability problems in fluid mechanics with applications to open- channel flows, transient flows in hydraulic systems and mathematical models for eddy current testing. He is the co-author of three monographs published by Academic Press and CRM. Andrei Kolyshkin has participated in more than 40 international conferences and has published more than 70 papers in refereed journals since 1980. As a visiting professor and visiting researcher he spent a few years at the University of Ottawa and Hong Kong University of Science and Technology.