O P - S F N E T - Volume 16, Number 5 – September 15, 2009

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The Electronic News Net of the
SIAM Activity Group on Orthogonal Polynomials and Special Functions
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Today's Topics:

Calendar of Events:

September 13-19, 2009

International Conference on Functional Equations and Inequalities, Krakow, Poland
http://mat.ap.krakow.pl/icfei/13ICFEI/index.php

September 24-30, 2009

6th Maratea Conference on Functional Analysis and Approximation Theory (FAAT2009), Acquafreda di Maratea, Italy
http://www.dm.uniba.it/faat2009

September 28 - October 2, 2009

Approximation and extrapolation of convergent and divergent sequences and series, CIRM Luminy, France
http://www.math.unipd.it/~luminy09/index.html

December 14-18, 2009

Brownian motion and random matrices - American Institute of Mathematics, Palo Alto, California
http://aimath.org/ARCC/workshops/brownianrmt.html

May 27-28, 2010

From A = B to Z = 60, a conference in honor of Doron Zeilberger's 60th birthday, Rutgers University, Piscataway, NJ, USA 16.5 #1
http://math.rutgers.edu/events/Z60/

August 19-27, 2010

International Congress of Mathematicians, Hyderabad, India
http://www.icm2010.org.in/

September 17-19, 2010

Symmetry, Separation, Super-integrability and Special Functions (S4) Conference, in honor of Willard Miller on the occasion of his retirement, University of Minnesota, Minneapolis, MN, USA,
http://math.umn.edu/conferences/s4/

Topic #1 ---------- OP-SF NET 16.5 ---------- September 15, 2009

From: OP-SF NET Editors
Subject: Zeilberger Conference

"From A = B to Z = 60", a conference in honor of Doron Zeilberger's 60th birthday, will be held at Rutgers University, Piscataway, NJ, USA on May 27-28, 2010.

Currently, the following are confirmed as main speakers.

- George Andrews (Penn State Univ, USA)
- Richard Askey (Univ of Wisconsin, Madison, USA)
- David Bressoud (Macalester College, USA)
- Dominique Foata (Univ of Starsbourg, France)
- Aviezri Fraenkel (Weizmann Inst. of Tech, Israel)
- Stavros Garoufalidis (Georgia Tech, USA)
- Toufik Mansour (Univ of Haifa, Israel)
- Victor Moll (Tulane Univ, USA)
- Kathy O'Hara (MSRI, USA)
- Peter Paule (Univ of Linz, Austria)
- Dennis Stanton (Univ of Minnesota, USA)
- Herb Wilf (Univ of Penn, USA)

For further information, see the web site
http://math.rutgers.edu/events/Z60/

Topic #2 ---------- OP-SF NET 16.5 ---------- September 15, 2009

From: Marcel de Bruin and Tom Koornwinder
Subject: Henk G. Meijer 1940-2009

Henk G. Meijer, professor emeritus at Delft University of Technology, passed away on 7 September 2009 at the age of 68. He is survived by his partner and a grown-up daughter.

Henk Meijer obtained his PhD at the University of Amsterdam in 1967 with a thesis in number theory (Uniform distribution of g-adic numbers); his advisor was Prof. Jan Popken. In 1968 he became a lector at Delft University of Technology where he was promoted to full professor (in Analysis) in 1973, keeping this position until his retirement at the end of 2005. During his first decade in Delft he continued working in number theory, publishing 21 papers with primary MSC classification 10 (Number Theory).

He spent much time on duties for the Department in various councils, several of which he chaired. After a period (1978-1984) without publications, he turned his research efforts to orthogonal polynomials and special functions. In particular he gave much attention to Sobolev orthogonal polynomials, on which he also published jointly with Francisco Marcellán and other Spanish mathematicians as well as with his Dutch collaborators. MathSciNet lists 11 of Henk Meijer's papers with primary MSC classification 42C05 (Orthogonal Functions and Polynomials) and 7 papers with primary classification 33 (Special Functions). His best-known paper is "Determination of all coherent pairs", J. Approx. Theory 89 (1997), 321-343 (MR1451509).

At Delft University of Technology Henk Meijer headed a group on classical analysis which included Herman Bavinck and Marcel de Bruin as senior members. Among his PhD students were Roelof Koekoek and René Swarttouw.

Topic #3 ---------- OP-SF NET 16.5 ---------- September 15, 2009

From: OP-SF NET Editors
Subject: Coimbra Lecture Notes on Orthogonal Polynomials

This is from the Nova Publishers website www.novapublishers.com

Coimbra Lecture Notes on Orthogonal Polynomials

Editors: Ana Pilar Foulquie Moreno and Amilcar Jose Pinto Lopes Branquinho (Universidade de Aveiro, Aveiro, Portugal

Book Description:
The topic of this book "Orthogonal Polynomials and Special Functions" (OPSF), has a very rich history, going back to 19th century when mathematicians and physicists tried to solve the most important differential equations of mathematical physics. Hermite-Padé approximation was also introduced in that time, to prove the transcendence of the remarkable constant *e* (the basis of the natural logarithm). Since then OPSF has developed to a standard subject within mathematics, which is driven by applications. The applications are numerous, both within mathematics (e.g. statistics, combinatorics, harmonic analysis, number theory) and other sciences, such as physics, biology, computer science, chemistry. The main reason for the fact that OPSF has been so successful over the centuries is its usefulness in other branches of mathematics and physics, as well as other sciences. There are many different aspects of OPSF. Some of the most important developments for OPSF are related to the theory of rational approximation of analytic functions, in particular the extension to simultaneous rational approximation to a system of functions. Important tools for rational approximation are Riemann-Hilbert problems, the theory of orthogonal polynomials, logarithmic potential theory, and operator theory for difference operators. This new book presents the latest research in the field.

There were seven series of lectures within sixty hours. Christian Berg discusses matrix polynomials orthogonality: complex measures and matrix measures, compact sets of positive matrix measures on the real line, Krein's theorem characterizing matrix moment sequences, matrix inner products and orthonormal matrix polynomials, and some consequences of the three-term recurrence relation. Guillermo López discusses the classical constructive theory of approximation, which is basic for the understanding of several important and classical results from this theory of orthogonal polynomials and the spectral theory of infinite dimensional matrices. Francisco Marcellán presents a self-contained survey of recent results on Sobolev orthogonal polynomials. The topics covered are standard orthogonal polynomials, Sobolev inner products: the multiplication operator, coherent pairs of measures, analytic properties of Sobolev orthogonal polynomials. Franz Peherstorfer discusses inverse images of polynomial mappings are the basis for investigations in polynomial iteration, which leads often directly to an understanding of the behaviour of the iterates and the extremal properties of the iterates. The purpose of these notes is to give basic material on the structure and the geometry of inverse polynomial images and on the behaviour of extremal polynomials on such sets, including several intervals or arcs, lemniscates, Julia sets of Cantor types, dendrites,. . . . In particular, many examples are given. Walter van Assche discusses some aspects of analytic number theory, in particular rational approximation of irrational numbers, irrationality proofs and transcendence proofs. Quite often the construction of rational approximants to real numbers is by means of continued fractions, Padé approximation or Hermite-Padé approximation, showing that rational approximation and special functions have interesting applications in analytic number theory. Semyon Yakubovich give a short introduction to the theory of integral transforms in Lebesgue spaces, which are associated with hypergeometric functions as their kernels. We deal with a class of the so-called Kontorovich-Lebedev type integral transforms, which includes, in particular, the familiar Kontorovich-Lebedev, Mehler-Fock, Olevskii and Lebedev transforms. Joaquin Bustoz discusses Hausdorff summability, q-theory of Hausdorff summability, and potential applications to unsolved problems. The lectures notes are aimed at graduate students and post-docs, or anyone who wants to have an introduction to (and learn about) the subjects mentioned. Each of the

contributions is self-contained, and contains up-to-date references to the literature so that anyone who wants to apply the results to his own advantage has a good starting point. The knowledge required for the lectures is real and complex analysis, some basic notions of algebra and discrete mathematics, and some elementary facts of orthogonal polynomials. A computer equipped with Maple software is useful to work on the exercises. So having mastered the lectures notes gives a good level to read research papers in this field, and to start doing research as well.

Table of Contents:

Series: Advances in the Theory of Special Functions and Orthogonal Polynomials, Renato Álvarez-Nodarse - Series Editor
Hardcover 2008 **ISBN:** 1-60021-972-1

Topic #4 ---------- OP-SF NET 16.5 ---------- September 15, 2009

From: OP-SF NET Editors
Subject: Book on Discrete Orthogonal Polynomials

The following information is from the web site

http://press.princeton.edu/titles/8450.html

Discrete Orthogonal Polynomials: Asymptotics and Applications (AM-164)
J. Baik, T. Kriecherbauer, K. T.-R. McLaughlin & P. D. Miller**Paper | 2007 |** $39.50 **/ £27.95, 184 pp. | 8 x 10 | 14 halftones. 6 line illus.**

This book describes the theory and applications of discrete orthogonal polynomials--polynomials that are orthogonal on a finite set. Unlike other books, *Discrete Orthogonal Polynomials* addresses completely general weight functions and presents a new methodology for handling the discrete weights case.
J. Baik, T. Kriecherbauer, K. T.-R. McLaughlin & P. D. Miller focus on asymptotic aspects of general, nonclassical discrete orthogonal polynomials and set out applications of current interest. Topics covered include the probability theory of discrete orthogonal polynomial ensembles and the continuum limit of the Toda lattice. The primary concern throughout is the asymptotic behavior of discrete orthogonal polynomials for general, nonclassical measures, in the joint limit where the degree increases as some fraction of the total number of points of collocation. The book formulates the orthogonality conditions defining these polynomials as a kind of Riemann-Hilbert problem and then generalizes the steepest descent method for such a problem to carry out the necessary asymptotic analysis.

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Topic #5 ---------- OP-SF NET 16.5 ---------- September 15, 2009

From: OP-SF NET Editors
Subject: Fredrik Johansson and mpmath

Fredrik Johannson wrote on August 13, 2009:
“I've blogged extensively about the new features that went into this version over the last two months. The short version of the changelog is "lots of special functions….". See http://fredrik-j.blogspot.com/2009/08/released-mpmath-013.html

Topic #6 ---------- OP-SF NET 16.5 ---------- September 15, 2009

From: OP-SF NET Editors
Subject: Book “Vistas of Special Functions”

The following information is form the web site:
http://www.worldscibooks.com/mathematics/7325.html

VISTAS OF SPECIAL FUNCTIONS II

by Kalyan Chakraborty (Harish Chandra Research Institute, India) , Shigeru Kanemitsu (Kinki University, Japan) , & Haruo Tsukada (Kinki University, Japan)

This book (Vistas II), is a sequel to Vistas of Special Functions (World Scientific, 2007), in which the authors made a unification of several formulas scattered around the relevant literature under the guiding principle of viewing them as manifestations of the functional equations of associated zeta-functions. In Vista II, which maintains the spirit of the theory of special functions through zeta-functions, the authors base their theory on a theorem which gives some arithmetical Fourier series as intermediate modular relations — avatars of the functional equations. Vista II gives an organic and elucidating presentation of the situations where special functions can be effectively used. Vista II will provide the reader ample opportunity to find suitable formulas and the means to apply them to practical problems for actual research. It can even be used during tutorials for paper writing.

Contents:

* Bernoulli and Allied Polynomials
* Chebyshev Polynomials and Energy Levels of Carbon Hydrates
* The Gamma Function Continued — Kummer's Fourier Series, The Stirling Formulas, Etc
* The Hurwitz-Lerch Zeta-Function
* The Dirichlet L-Function
* Arithmetical Fourier Series

* The Madelung Constants and Special Functions
* Applications of Fourier Series — Parseval Identity
* The Derivative of Dirichlet L-Function and the Kronecker Limit Formula

Readership: Graduate students and researchers in pure mathematics.
200pp Pub. date: Nov 2009
ISBN: 978-981-4273-97-8
981-4273-97-X US$70 / £53

Topic #7 ---------- OP-SF NET 16.5 ---------- September 15, 2009

From: Tom Koornwinder T.H.Koornwinder@uva.nl
Subject: ICM speakers

Arno Kuijlaars will be an invited speaker in the Analysis section at ICM (International Congress of Mathematicians), Hyderabad, India, August 19-27, 2010. Other invited speakers with some OP-SF connection are **Alexander Its** and **Fedor Nazarov** in the Analysis section and **Alexei Borodin** in the sections on Mathematical Physics and Probability & Statistics.

See http://www.icm2010.org.in/speakers.php

for more information on speakers. For further information on ICM, see

http://www.icm2010.org.in/

Topic #8 ---------- OP-SF NET 16.5 ---------- September 15, 2009

From: OP-SF NET Editors
Subject: Preprints in arXiv.org

The following preprints related to the fields of orthogonal polynomials and special functions were posted or cross-listed to one of the subcategories of arXiv.org mostly during July and August 2009.

http://arxiv.org/abs/0907.2260
Pure states, positive matrix polynomials and sums of hermitian squares
Authors: Igor Klep, Markus Schweighofer

http://arxiv.org/abs/0907.2612
Orthogonal polynomials associated to a certain fourth order differential equation
Authors: Joachim Hilgert, Toshiyuki Kobayashi, Gen Mano, Jan Möllers

http://arxiv.org/abs/0907.2836
Inequalities for the Polar Derivative of a Polynomial
Authors: M. Shakeri, M.Bidkham, M.Eshaghi Gordji

http://arxiv.org/abs/0907.2865
Rationality of generating functions of rook polynomials and permanents of Kronecker products of Toeplitz matrices and circulants with the matrix J_k and their evaluation. I
Authors: A. M. Kamenetskii

http://arxiv.org/abs/0907.2946
Some identities of the generalized twisted Bernoulli numbers and polynomials of highert order
Authors: Younghee Kim, Seog-Hoon Rim, Byungje Lee, Taekyun Kim

http://arxiv.org/abs/0907.3851
The Symmetrical H_{q}-Semiclassical Orthogonal Polynomials of Class One
Authors: Abdallah Ghressi, Lotfi Khériji

http://arxiv.org/abs/0907.3859
On condition numbers of polynomial eigenvalue problems with nonsingular leading coefficients
Authors: Nikolaos Papathanasiou, Panayiotis Psarrakos

http://arxiv.org/abs/0907.3950
Macdonald polynomials and symmetric functions
Authors: Robin Langer

http://arxiv.org/abs/0907.4355
Decompositions of Trigonometric Polynomials with Applications to Multivariate Subdivision Schemes
Authors: Nira Dyn, Maria Skopina

http://arxiv.org/abs/0907.4889
A note on the generalized Euler numbers and polynomials
Authors: T. Kim

http://arxiv.org/abs/0907.5095
Note on q-Dedekind type sums related to q-Euler polynomials
Authors: T. Kim

http://arxiv.org/abs/0907.0156
Average characteristic polynomials for multiple orthogonal polynomial ensembles
Authors: Steven Delvaux

http://arxiv.org/abs/0907.0165
q-Lucas polynomials and associated Rogers-Ramanujan type identities
Authors: Johann Cigler

http://arxiv.org/abs/0908.0364
Polynomial Matrix Inequality and Semidefinite Representation
Authors: Jiawang Nie

http://arxiv.org/abs/0908.0668
Moving least squares via orthogonal polynomials
Authors: Michael Carley

http://arxiv.org/abs/0908.1219
q-Fibonacci polynomials and q-Genocchi numbers
Authors: Johann Cigler

http://arxiv.org/abs/0908.2552
Polynomial perturbations of hermitian linear functionals and difference equations
Authors: M. J. Cantero, L. Moral, L. Velazquez

http://arxiv.org/abs/0908.2585
Investigating Fubini and Bell Polynomials with Euler-Seidel Algorithm
Authors: Ayhan Dil, Veli Kurt

http://arxiv.org/abs/0908.2609
Laurent polynomials and Eulerian numbers
Authors: Daniel Erman, Gregory G. Smith, Anthony Várilly-Alvarado

http://arxiv.org/abs/0908.3894
An urn model associated with the Jacobi polynomials
Authors: F. Alberto Grünbaum

http://arxiv.org/abs/0908.4049
Continuous analogs of polynomials orthogonal on the unit circle. Krein systems
Authors: Sergey A. Denisov

http://arxiv.org/abs/0908.3253
On the possible exceptions for the transcendence of the log-gamma function at rational values and its consequences for the transcendence of $ \log{\pi} $ and $ \pi e $
Authors: F. M. S. Lima

http://arxiv.org/abs/0907.4384
A product of Gamma function values at fractions with the same denominator
Authors: Greg Martin

http://arxiv.org/abs/0907.1689
Small Gamma Products with Simple Values
Authors: Albert Nijenhuis

http://arxiv.org/abs/0907.2870
On the least common multiple of q-binomial coefficients
Authors: Victor J. W. Guo

http://arxiv.org/abs/0908.3151
Tridiagonal pairs of q-Racah type and the μ-conjecture
Authors: Kazumasa Nomura, Paul Terwilliger

http://arxiv.org/abs/0908.2604
Tridiagonal pairs and the μ-conjecture
Authors: Kazumasa Nomura, Paul Terwilliger

http://arxiv.org/abs/0908.4098
A characterization of Q-polynomial distance-regular graphs
Authors: Aleksandar Jurisic, Paul Terwilliger, Arjana Zitnik

http://arxiv.org/abs/0907.2934
Shatalov-Sternin's construction of complex WKB solutions -- a comment on geometric issues
Authors: Alexander Getmanenko

http://arxiv.org/abs/0908.4287
A Note on the Zero-Free Regions of the Zeta Function
Authors: N. A. Carella

http://arxiv.org/abs/0908.1427
A new derivation of Hermite's integral for the Hurwitz zeta function
Authors: Donal F Connon

http://arxiv.org/abs/0908.2008
Bounding |\zeta(1/2 + it)| on the Riemann hypothesis
Authors: Vorrapan Chandee, Kannan Soundararajan

http://arxiv.org/abs/0907.5561
On the Selberg integral of the $k-$divisor function and the $2k-$th moment of the Riemann zeta function
Authors: Giovanni Coppola

http://arxiv.org/abs/0907.1910
On the value-distribution of the Riemann zeta-function on the critical line
Authors: Justas Kalpokas, Jörn Steuding

http://arxiv.org/abs/0908.0558
Painlevé VI and Hankel determinants for the generalized Jacobi Weight
Authors: Dan Dai, Lun Zhang

Topic #9 ---------- OP-SF NET 16.5 ---------- September 15, 2009

From: OP-SF NET Editors
Subject: About the Activity Group

The SIAM Activity Group on Orthogonal Polynomials and Special Functions consists of a broad set of mathematicians, both pure and applied. The Group also includes engineers and scientists, students as well as experts. We have around 140 members scattered about in more than 20 countries. Whatever your specialty might be, we welcome your participation in this classical, and yet modern, topic. Our WWW home page is:

http://math.nist.gov/opsf/

This is a convenient point of entry to all the services provided by the Group. Our Webmaster is Bonita Saunders (bonita.saunders@nist.gov).

The Activity Group sponsors OP-SF NET, which is transmitted periodically by SIAM. It is provided as a free public service; membership in SIAM is not required. The OP-SF Net Editors are Diego Dominici (dominicd@newpaltz.edu) and Martin Muldoon (muldoon@yorku.ca).

To receive the OP-SF NET, send your name and email address to
poly-request@siam.org .

Back issues can be obtained at the WWW addresses:
http://staff.science.uva.nl/~thk/opsfnet

For several years the Activity Group sponsored a printed Newsletter, most recently edited by Rafael Yanez. Back issues are accessible at:
http://www.mathematik.uni-kassel.de/~koepf/siam.html

SIAM has several categories of membership, including low-cost categories for students and residents of developing countries. For current information on SIAM and Activity Group membership, contact:

Society for Industrial and Applied Mathematics
3600 University City Science Center
Philadelphia, PA 19104-2688 USA
phone: +1-215-382-9800
email: service@siam.org
WWW : http://www.siam.org
http://www.siam.org/membership/outreachmem.htm

Finally, the Activity Group operates an email discussion group, called OP-SF Talk. To subscribe, send the email message

subscribe opsftalk Your Name

to listproc@nist.gov. To contribute an item to the discussion, send email to opsftalk@nist.gov. The archive of all messages is accessible at:
http://math.nist.gov/opsftalk/archive

Topic #10 ---------- OP-SF NET 16.5 ---------- September 15, 2009

From: OP-SF NET Editors
Subject: Submitting contributions to OP-SF NET

To contribute a news item to OP-SF NET, send email to poly@siam.org with a copy to one of the OP-SF Editors dominicd@newpaltz.edu or muldoon@yorku.ca . Contributions to OP-SF NET 16.6 should be sent by November 1, 2009.

OP-SF NET is a forum of the SIAM Activity Group on Special Functions and Orthogonal polynomials. We disseminate your contributions on anything of interest to the special functions and orthogonal polynomials community. This includes announcements of conferences, forthcoming books, new software, electronic archives, research questions, job openings.

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http://math.nist.gov/opsfnet/archive
WWW home page of this Activity Group:
http://math.nist.gov/opsf/
Information on joining SIAM and this activity group: service@siam.org

The elected Officers of the Activity Group (2008-2010) are:
Francisco J. Marcellán , Chair
Peter A. Clarkson, Vice Chair
Daniel W. Lozier, Secretary
Peter A. McCoy, Program Director
The appointed officers are:
Diego Dominici, OP-SF NET co-editor
Martin Muldoon, OP-SF NET co-editor
Bonita Saunders, Webmaster