

OP - SF NET - Volume 16, Number 2 – March 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:

1. Ancient Chinese Mathematics
2. Preprints in arXiv.org
3. About the Activity Group
4. Submitting contributions to OP-SF NET

Calendar of Events:

March 21-24, 2009

Workshop "Approximation Theory and Signal Analysis"
dedicated to Professor Paul Leo Butzer on the occasion of his 80th birthday
Lindau (Lake Constance), Germany 15.6, #2 16.1, #1
http://ibb.helmholtz-muenchen.de/~biomath/workshop_atasa.html

March 25-30, 2009

Random Matrices and Integrability: From Theory to Application, Yad
Hashmona, Israel
<http://www.hit.ac.il/staff/kanzieper/yad8>

April 13-25, 2009

CIMPA-Unesco-Tunisia School "Analytical and Probabilistic Aspects of Dunkl
Theory", Monastir, Tunisia 15.5 #6
<http://www.cimpa-icpam.org/Anglais/2009Prog/Tunisia09.html>

April 19--26, 2009 - ****CANCELLED****

NoDIA-2009: Nonlinear Differential Equations, Integrability and Applications -
Cape Town, South Africa.

June 8-12, 2009

Sixth International Conference on Computational Methods and Function Theory,
Ankara, Turkey. 15.4 #2
<http://www.bilkent.edu.tr/~cmft/>

June 14-20, 2009

47th International Symposium on Functional Equations Gargnano, Italy.
GianLuigi.Forti@mat.unimi.it

June 15-18, 2009

3rd International Conference on Mathematics & Statistics, Athens, Greece
<http://www.atiner.gr/docs/Mathematics.htm>

June 25-28, 2009

International Conference on Applied Analysis and Scientific Computation
Shanghai Normal University, Shanghai, China 15.5 #4
<http://mathsc.shnu.edu.cn/conference/index.htm>

June 29 - July 3, 2009

Workshop "Discrete systems and special functions", Newton Institute for
Mathematical Sciences, Cambridge, UK. 15.5 #9
<http://www.newton.ac.uk/programmes/DIS/ws.htm>

July 6-10, 2009

2009 SIAM Annual Meeting, Denver, Colorado, USA
<http://www.siam.org/meetings/an09/>

July 20-24, 2009

FPSAC'09 -21st Annual International Conference on
Formal Power Series and Algebraic Combinatorics, Hagenberg, Austria
15.5 #3
<http://www.risc.jku.at/conferences/fpsac2009>

July 20-25, 2009

10th Symposium on Orthogonal Polynomials, Special Functions and Applications
(OPSFA-10), Leuven, Belgium 15.5 #2 16.1 #2
<http://wis.kuleuven.be/OPSFA/OPSFA10.html>

September 4-9, 2009

2nd Dolomites Workshop on Constructive Approximation and Applications"
(DWCAA09), Alba di Canazei (Trento), Italy
<http://www.math.unipd.it/~dwcaa09>

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>

Topic #1 ----- OP-SF NET 16.2 ----- March 15, 2009

From: OP-SF NET Editors
Subject: Ancient Chinese Mathematics

In the January/February 2009 issue of SIAM News Philip Davis wrote a review of Simon Winchester's "The Man Who Loved China". This book describes the life of Joseph Needham, a distinguished biochemist from Cambridge University, England, and author of the multi-volume "Science and Civilization in China" (Cambridge University Press). Volume 3 (1959) contains 168 pages on ancient Chinese mathematics, which is why Needham is a person of particular interest to Davis and to us. The reviewer discusses not just the book under review, but has interesting things to say about the critical reception of Needham's work by later historians of science. For criticisms of Needham specific to mathematics, Davis turns to the book "A History of Chinese Mathematics" by Jean-Claude Martzloff, which, in his outsider's judgment, is currently the best general history of the subject; it places the mathematics strongly within the ancient Chinese cultural context.

Tom Koornwinder wrote the following reaction to Davis' book review as a Letter to the Editor. This reaction will appear in the next issue of SIAM News.

With interest I read Philip Davis's book review "Why Didn't They ...?" in SIAM News (January/February 2009, page 6). Encouraged by his recommendation, I borrowed the book A History of Chinese Mathematics by J.-C. Martzloff from the library. However, I am somewhat disappointed by the coverage of Zhu Shijie (ca. 1300) in this book.

See Needham, Vol. 3, pp. 138, 139 for formulas due to Zhu Shijie (written by Needham as Chu Shih-Chieh), which were reformulated by Askey (Orthogonal Polynomials and Special Functions, SIAM, 1975, pp. 59, 60) as Vandermonde's sum (the explicit summation of the terminating Gauss hypergeometric function of argument 1). Therefore, Vandermonde's sum is now called the Chu-Vandermonde sum by the special functions community.

Martzloff, however, does not mention this work by Zhu Shijie. He does treat in some detail in Chapter 18 the much later (19th century) work of Li Shanlan. The formula (18.1) there can be reformulated as a special case of Saalschutz's formula for hypergeometric ${}_3F_2(1)$. According to secondary sources quoted by Askey, this formula (18.1), too, seems to go back to Zhu Shijie. However, the only mention of Zhu Shijie in Chapter 18 is in a quote from the preface of the book by Li Shanlan:

"Master Zhu Shijie from the Yuan dynasty is the only one who has made use of the prescriptions relating the piling up of heaps in the chapters of his Siyuan yujian entitled But his intention was only to expound the algebra and for that reason he presents the piling up of heaps neither precisely nor methodically."

Martzloff speculates in this chapter about influences on Li Shanlan by Western mathematical work. But if some of Li Shanlan's formulas go back to Zhu Shijie, then Western influence on this part is less probable.

Needham, after the formulas quoted by Askey, hints at "many other formulas of similar nature" given by Chu Shih-Chieh. I would like to see a transcription of this part of Chu's writings, to learn what further treasures his work might contain.

Tom Koornwinder,
Korteweg-de Vries Institute for Mathematics,
University of Amsterdam.

Topic #2 ----- OP-SF NET 16.2 ----- March 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 January and February 2009.

<http://arxiv.org/abs/0901.0054>
Counting decomposable univariate polynomials
Authors: [Joachim von zur Gathen](#)

<http://arxiv.org/abs/0901.0190>
Airy functions over local fields
Authors: [Rahul N. Fernandez](#), [V. S. Varadarajan](#), [David Weisbart](#)

<http://arxiv.org/abs/0901.0249>
On the q-Extensions of the Bernoulli and Euler Numbers, Related Identities and Lerch Zeta Function
Authors: [Taekyun Kim](#), [Younghee Kim](#), [kyoungwon Hwang](#)

<http://arxiv.org/abs/0901.0324>
Beta Jacobi processes
Authors: [Nizar Demni](#)

<http://arxiv.org/abs/0901.0353>
New approach to q-Genocchi, Euler numbers and polynomials and their interpolation functions
Authors: [Taekyun Kim](#)

<http://arxiv.org/abs/0901.0435>

Convergence of ray sequences of Pade approximants to ${}_2F_1(a,1;c;z)$, $c>a>0$
Authors: [K Driver](#), [K Jordaan](#)

<http://arxiv.org/abs/0901.0746>

$O(N)$ colour-flavour transformations and characteristic polynomials of real random matrices
Authors: [Yi Wei](#), [Boris A. Khoruzhenko](#)

<http://arxiv.org/abs/0901.0837>

Structural Relations of Harmonic Sums and Mellin Transforms at Weight $w=6$
Authors: [Johannes Blümlein](#)

<http://arxiv.org/abs/0901.0897>

Gap Probabilities in Non-Hermitian Random Matrix Theory
Authors: [G. Akemann](#), [M.J. Phillips](#), [L. Shifrin](#)

<http://arxiv.org/abs/0901.0947>

Orthogonal polynomials on the unit circle, q -Gamma weights, and discrete Painlevé equations
Authors: [Philippe Biane](#)

<http://arxiv.org/abs/0901.0982>

Complex Hadamard matrices from Sylvester inverse orthogonal matrices
Authors: [Petre Dita](#)

<http://arxiv.org/abs/0901.1104>

Mathieu's series: inequalities, asymptotics and positive definiteness
Authors: [Viktor P. Zastavnyi](#)

<http://arxiv.org/abs/0901.1379>

Pseudo-factorials, elliptic functions, and continued fractions
Authors: [Roland Bacher](#), [Philippe Flajolet](#)

<http://arxiv.org/abs/0901.1548>

On Gram's law in the theory of the Riemann zeta function
Authors: [Jan Mozer](#)

<http://arxiv.org/abs/0901.1697>

Note on the generalization of the higher order q -Genocchi numbers and q -Euler numbers
Authors: [Taekyun Kim](#), [Young-hee Kim](#), [Kyoung-won Hwang](#)

<http://arxiv.org/abs/0901.1725>

Inequalities for the eigenvalues of non-selfadjoint Jacobi operators
Authors: [Marcel Hansmann](#), [Guy Katriel](#)

<http://arxiv.org/abs/0901.1883>

Hankel determinants of Dirichlet series

Authors: [H. Monien](#)

<http://arxiv.org/abs/0901.2006>

The fermionic p-adic integrals on \mathbb{Z}_p associated with extended q-Euler numbers and polynomials

Authors: [Taekyun Kim](#)

<http://arxiv.org/abs/0901.2083>

Some applications of the Stieltjes constants

Authors: [Donal F. Connon](#)

<http://arxiv.org/abs/0901.2424>

A new type of critical behaviour in random matrix models

Authors: [R. Flume](#), [A. Klitz](#)

<http://arxiv.org/abs/0901.2473>

Higher order analogues of the Tracy-Widom distribution and the Painleve II hierarchy

Authors: [T. Claeys](#), [A. Its](#), [I. Krasovsky](#)

<http://arxiv.org/abs/0901.2655>

On Non-central Stirling Numbers of the First Kind

Authors: [Milan Janjic](#)

<http://arxiv.org/abs/0901.2940>

Orthogonality of Jacobi and Laguerre polynomials for general parameters via the Hadamard finite part

Authors: [Rodica D. Costin](#)

<http://arxiv.org/abs/0901.3328>

On the Geometric Interpretation of the Complex Fourier Transforms of a Class of Exponential Functions

Authors: [Jeremy Williams](#)

<http://arxiv.org/abs/0901.3377>

Mean Staircase of the Riemann Zeros: a comment on the Lambert W function and an algebraic aspect

Authors: [Davide a Marca](#), [Stefano Beltraminelli](#), [Danilo Merlini](#)

<http://arxiv.org/abs/0901.3379>

Zonal polynomials and hypergeometric functions of quaternion matrix argument

Authors: [Fei Li](#), [Yifeng Xue](#)

<http://arxiv.org/abs/0901.3452>

Ramanujan Summation and the Exponential Generating Function $\sum_{k=0}^{\infty} \frac{z^k}{k!} \zeta^{(-k)}$

Authors: [B. Candelpergher](#), [H. Gopalkrishna Gadiyar](#), [R. Padma](#)

<http://arxiv.org/abs/0901.3518>

On the Zeros of the Complex Fourier Transforms of a Class of Exponential Functions

Authors: [Jeremy Williams](#)

<http://arxiv.org/abs/0901.3970>

Integrals of products of Hermite functions

Authors: [Wei-Min Wang](#)

<http://arxiv.org/abs/0901.3973>

Jacob's ladders and the almost exact asymptotic representation of the Hardy-Littlewood integral

Authors: [Jan Moser](#)

<http://arxiv.org/abs/0901.4176>

The sl_3 Selberg integral

Authors: [S. Ole Warnaar](#)

<http://arxiv.org/abs/0901.4501>

Some properties of deformed q -numbers

Authors: [Thierry C. Petit Lobão](#), [Pedro G. S. Cardoso](#), [Suani T. R. Pinho](#), [Ernesto P. Borges](#)

<http://arxiv.org/abs/0901.4564>

The p -adic valuations of sequences counting alternating sign matrices

Authors: [Xinyu Sun](#), [Victor H. Moll](#)

<http://arxiv.org/abs/0901.4680>

Hankel determinants of Schroeder-like numbers

Authors: [Johann Cigler](#)

<http://arxiv.org/abs/0901.4698>

Hankel determinants of q -exponential polynomials

Authors: [Johann Cigler](#)

<http://arxiv.org/abs/0901.2244>

Matrix valued Szego polynomials and quantum random walks

Authors: [M. J. Cantero](#), [F. A. Grünbaum](#), [L. Moral](#), [L. Velazquez](#)

<http://arxiv.org/abs/0901.2717>

On the Spatial Asymptotics of Solutions of the Toda Lattice

Authors: [Gerald Teschl](#)

<http://arxiv.org/abs/0901.4716>

Feynman Diagrams, Differential Reduction, and Hypergeometric Functions

Authors: [M. Yu. Kalmykov](#) (Hamburg U., Inst. Theor. Phys. II & Dubna, JINR), [V. V. Bytev](#) (Hamburg U., Inst. Theor. Phys. II & Dubna, JINR) [Bernd A. Kniehl](#) (Hamburg U., Inst. Theor. Phys. II), [B.F.L. Ward](#) (Baylor U.), [S.A. Yost](#) (Citadel Military Coll.)

<http://arxiv.org/abs/0902.0041>

Polynomial solutions of differential-difference equations

Authors: [Diego Dominici](#), [Kathy Driver](#), [Kerstin Jordaan](#)

<http://arxiv.org/abs/0902.0051>

Compatibility of the Theta correspondence with the Whittaker functors

Authors: [Vincent Lafforgue](#) (University Paris 6), [Sergey Lysenko](#) (University Nancy 1)

<http://arxiv.org/abs/0902.0054>

On generalized Cauchy-Stieltjes transforms of some Beta distributions

Authors: [Nizar Demni](#)

<http://arxiv.org/abs/0902.0116>

A passage to the Poisson-Dirichlet through the Bessel square processes

Authors: [Soumik Pal](#)

<http://arxiv.org/abs/0902.0193>

Critical measures, quadratic differentials, and weak limits of zeros of Stieltjes polynomials

Authors: [A. Martinez-Finkelshtein](#), [E. A. Rakhmanov](#)

<http://arxiv.org/abs/0902.0380>

Special Functions Related to Dedekind Type DC-Sums and their Applications

Authors: [Yilmaz Simsek](#)

<http://arxiv.org/abs/0902.0413>

On the number of real critical points of logarithmic derivatives and the Hawaii conjecture

Authors: [Mikhail Tyaglov](#)

<http://arxiv.org/abs/0902.0451>

Cariñena polynomials are Jacobi polynomials

Authors: [C. Vignat](#), [P.W. Lambert](#)

<http://arxiv.org/abs/0902.0621>

Basic hypergeometric functions as limits of elliptic hypergeometric functions

Authors: [Fokko van de Bult](#), [Eric Rains](#)

<http://arxiv.org/abs/0902.0789>

The series limit of $\sum_k 1/[k \log k (\log \log k)^2]$

Authors: [Richard J. Mathar](#)

<http://arxiv.org/abs/0902.0797>

De Toda à KdV

Authors: [Dario Bambusi](#), [Thomas Kappeler](#), [Thierry Paul](#) (DMA)

<http://arxiv.org/abs/0902.0804>

On a nonlinear recurrent relation

Authors: [Dong Li](#)

<http://arxiv.org/abs/0902.0852>

Computing the smallest eigenvalue of large ill-conditioned Hankel matrices
Authors: [Niall Emmart](#), [Charles C. Weems](#), [Yang Chen](#)

<http://arxiv.org/abs/0902.0910>

A novel analytical operator method to solve linear ordinary differential equations with variable coefficients
Authors: [Wrick Sengupta](#)

<http://arxiv.org/abs/0902.1027>

Condensation of the roots of real random polynomials on the real axis
Authors: [Gregory Schehr](#), [Satya N. Majumdar](#)

<http://arxiv.org/abs/0902.1058>

Multiple orthogonal polynomial ensembles
Authors: [Arno B.J. Kuijlaars](#)

<http://arxiv.org/abs/0902.1650>

A simple approach to some Hankel determinants
Authors: [Johann Cigler](#)

<http://arxiv.org/abs/0902.1691>

A recurrence relation for the Li/Keiper constants in terms of the Stieltjes constants
Authors: [Donal F. Connon](#)

<http://arxiv.org/abs/0902.2099>

Recurrence formulas for Macdonald polynomials of type A
Authors: [Michel Lassalle](#), [Michael J. Schlosser](#)

<http://arxiv.org/abs/0902.2188>

Some integrals involving the Stieltjes constants
Authors: [Donal F. Connon](#)

<http://arxiv.org/abs/0902.2390>

Group Classification of a family of second-order differential equations
Authors: [J.C. Ndogmo](#)

<http://arxiv.org/abs/0902.2513>

A complete solution to an open problem relating to an inequality for ratios of gamma functions
Authors: [Feng Qi](#), [Bai-Ni Guo](#)

<http://arxiv.org/abs/0902.2514>

Bounds for the ratio of two gamma functions--From Wendel's limit to Elezović-Giordano-Pečarić's theorem
Authors: [Feng Qi](#)

<http://arxiv.org/abs/0902.2519>

A short proof of monotonicity of a function involving the psi and exponential functions

Authors: [Feng Qi](#), [Bai-Ni Guo](#)

<http://arxiv.org/abs/0902.2588>

Concise sharpening and generalizations of Shafer's inequality for the arc sine function

Authors: [Feng Qi](#), [Bai-Ni Guo](#)

<http://arxiv.org/abs/0902.2991>

Generalized Heun and Lamé's equations: factorization

Authors: [Mahouton Norbert Hounkonnou](#), [André Ronveaux](#)

<http://arxiv.org/abs/0902.3073>

Log-convexity and log-concavity of hypergeometric-like functions

Authors: [D.Karp](#), [S.M. Sitnik](#)

<http://arxiv.org/abs/0902.3190>

On a polynomial zeta function

Authors: [Sergio L. Cacciatori](#)

<http://arxiv.org/abs/0902.3440>

Curves defined by Chebyshev polynomials

Authors: [Gene Freudenburg](#), [Jenna Freudenburg](#)

<http://arxiv.org/abs/0902.3870>

Asymptotic Independence of the Extreme Eigenvalues of GUE

Authors: [Folkmar Bornemann](#)

<http://arxiv.org/abs/0902.3953>

Nearest lambda_q-multiple fractions

Authors: [Dieter Mayer](#), [Tobias Mühlenbruch](#)

<http://arxiv.org/abs/0902.4064>

Differential equations for deformed Laguerre polynomials

Authors: [Peter J. Forrester](#), [Christopher M. Ormerod](#)

<http://arxiv.org/abs/0902.4169>

Arithmetic theory of q-difference equations (G_q-functions and q-difference modules of type G, global q-Gevrey series)

Authors: [Lucia Di Vizio](#)

<http://arxiv.org/abs/0902.4608>

Quantum alpha-determinants and q-deformed hypergeometric polynomials

Authors: [Kazufumi Kimoto](#)

<http://arxiv.org/abs/0902.4732>

On the number zeta(3)

Authors: [L.A.Gutnik](#)

<http://arxiv.org/abs/0902.1974>

Coherent states of a particle in magnetic field and Stieltjes moment problem

Authors: [J.P. Gazeau](#), [M.C. Baldiotti](#), [D.M. Gitman](#)

Topic #3 ----- OP-SF NET 16.2 ----- March 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 (dominid@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:

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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 #4 ----- OP-SF NET 16.2 ----- March 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 16.3 should be sent by May 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.

Send submissions to: poly@siam.org

Subscribe by mailing to: poly-request@siam.org

or to: listproc@nist.gov

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<http://staff.science.uva.nl/~thk/opsfnet>

<http://www.math.ohio-state.edu/JAT/DATA/OPSFNET/opsfnet.html>

<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