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The Electronic News Net of the
SIAM Activity Group on Orthogonal Polynomials and Special Functions

http://math.nist.gov/opsf

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Topics:

Calendar of Events:

July 28-August 1 , 2025
The Third Joint SIAM/CAIMS Annual Meetings (AN25)
Montréal, Québec, Canada
https://www.siam.org/conferences-events/siam-conferences/an25/

August 6-7, 2025
2nd International Conference on Mathematical Analysis and Applications (MAA 2025)
with Virtual / Online Presentations
National Institute of Technology Jamshedpur, Jamshedpur, India
https://maanitjsr.github.io/

August 19-22, 2025
Extremal Polynomials and Dynamical Systems
Carlsberg Academy, Copenhagen, Denmark
https://www.math.ku.dk/english/calendar/events/epds/

June 22-26, 2026
OPERA 2026 - Orthogonal Polynomials, Exponential analysis, Rational Approximation, with applications
University of Stirling, Scotland, UK
https://www.opera2026.uk/

July 8–18, 2026

Foundations of Computational Mathematics (FoCM 2026), University of Vienna, Vienna, Austria
https://focm2026.univie.ac.at/

Workshop related to SIAG/OPSF:

July 9–11: **Special Functions and Orthogonal Polynomials**
Organizers: Daan Huybrechs, Erik Koelink and Teresa Pérez

August 17–21, 2026

18th International Symposium on Orthogonal Polynomials, Special Functions and Applications
Muromachi Campus, Doshisha University, Kyoto, Japan

Topic #1 ——— OP – SF Net 32.4 ——— July 15, 2025

From: Manuel Domínguez de la Iglesia (manuel.dominguezi@uah.es)
Subject: Announcement: OPSF-S11 Summer School in Alcalá, Spain

The OPSF-S11 Summer School (see link for other OPSFA summer schools in this series) will take place at the Universidad de Alcalá, Spain (near Madrid) from June 15 to June 19, 2026. This edition offers a comprehensive program on orthogonal polynomials and special functions, combining classical topics with modern developments and applications. The school includes lectures, tutorials, and research sessions, and is intended for Master's, PhD, and postdoctoral researchers with a solid background in mathematics, physics, or related disciplines.

The summer school will host five different sets of courses/lectures taught by: (1) Marco Bertola (Concordia University, Montreal, Canada), (2) Annie Cuyt (University of Stirling, Scotland, UK, and Universiteit Antwerpen, Belgium), (3) Arno Kuijlaars (Katholieke Universiteit Leuven, Belgium), (4) Lidia Fernández (Universidad de Granada, Spain) and (5) Luis Velázquez (Universidad de Zaragoza, Spain).

The course descriptions are as follows:

- **Course 1**: Asymptotic methods for Orthogonal Polynomials and more general Padé approximants.

  Lecturer: Marco Bertola (Concordia University, Montreal, Canada).

  Course overview: The goal of the course is to familiarize the students with the description of the asymptotic of orthogonal polynomials that employs the so-called "Riemann Hilbert Method". The method was introduced in the late nineties and saw the main application in the first proof of "universality" results in Random Matrix Theory. In the literature, the specific technique is variably referred to as "nonlinear steepest descent method" or "Deift-Zhou method". A particular appeal of the method is that it applies to a wider range of problems which include asymptotic studies for nonlinear integrable wave equations like the Korteweg-deVries equation or the nonlinear Schrödinger equation, used in oceanography and nonlinear optics, respectively. The goal of the course is, however, focused on the case of orthogonal polynomials, or rather denominators of Padé approximations (namely the so-called "non-Hermitean" orthogonality). Of special interest are the cases of "semiclassical" orthogonal polynomials introduced by Shohat, Maroni, Marcellán, Rocha, and their asymptotics. The method combines input from potential theory as well as analysis, and is able to provide "strong-asymptotic results" for orthogonal polynomials, in principle allowing for a complete asymptotic expansion for large degree valid point-wise in the plane. Time permitting, we will touch upon applications of the method beyond orthogonal polynomials and to the newly introduced notion of Padé approximations on higher genus Riemann surfaces.

  A rough breakdown of the course is as follows:

- Padé approximations and Orthogonal Polynomials;
- Generalities about Riemann–Hilbert problems (RHPs); formulation of Padé approximation problems in terms of RHPs.
- Large degree asymptotic analysis:
  1. Elements of potential theory and the "g–function" mechanism;
  2. Reduction of the RHP to a "small–norm" problem;
  3. Construction of "parametrices"; approximate solutions;
  4. Some aspects of geometry of Riemann surfaces needed for the construction of parametrices;
  5. Padé approximants on Riemann surfaces (time permitting);
  6. Other applications of the method and interesting problems (time permitting)

The method is seeing continued developments and new applications to this day, with an ever growing literature; the first instances where the method was developed are:

- P. Deift and X. Zhou, A steepest descent method for oscillatory Riemann–Hilbert problems. Bull. Amer. Math. Soc. (N.S.), 26(1):119–123, 1992.
- P. Deift, "Orthogonal Polynomials and Random Matrices: a Riemann–Hilbert approach"; Courant Institute Lectures, ('98);
- P. Deift, T. Kriecherbauer, K. T.–R. McLaughlin, S. Venakides, and X. Zhou, Uniform asymptotics for polynomials orthogonal with respect to varying exponential weights and applications to universality questions in random matrix theory. Comm. Pure Appl. Math., 52(11):1335–1425, 1999.

- **Course 2**: Connections between Orthogonal Polynomials, Sparse Interpolation, Exponential Analysis, Padé Approximation and Gaussian Integration.

  Lecturer: Annie Cuyt (University of Stirling, Scotland, UK, and Universiteit Antwerpen, Belgium).

  Course overview: This course explores the deep connections between various mathematical tools and techniques: orthogonal polynomials, Padé approximation, Gaussian quadrature, exponential analysis, and sparse interpolation. Despite appearing in different contexts, all of these methods are linked through a common structure—Hankel matrices.

  The course explains how orthogonal polynomials can be formally defined using a linear functional, and how these polynomials naturally relate to Padé approximants of a power series with the linear functional's scalar values as coefficients. When, in addition, these values are moment integrals with respect to a weight function, the Padé approximants can be interpreted as Gaussian quadrature rules, where the nodes and weights have a direct connection to the polynomials orthogonal with respect to the given linear functional.

  Further, the problem of reconstructing the Gaussian nodes and weights from the given moments, is shown to be equivalent to exponential analysis or the Prony problem—a classic inverse problem. In the context of computer algebra, this is referred to as sparse interpolation. The discussion also highlights how the nodes can be obtained from the generalized eigenvalues of a Hankel structured matrix pencil, and how the weights are computed by solving a linear system with a Vandermonde structure. Finally, it is noted that these relationships and methods can be extended to the multivariate setting, provided the appropriate generalizations are applied.

- **Course 3**: From Jacobi polynomials to random tilings.

  Lecturer: Arno Kuijlaars (Katholieke Universiteit Leuven, Belgium).

Course overview: In the first part of the course, we discuss the asymptotic behavior of Jacobi polynomials with varying parameters. This is used as a toy model to illustrate the powerful Riemann-Hilbert analysis The second part of the course will cover a recent application of Jacobi polynomials with varying non-standard parameters to random tiling problems.

Provisional outline:

1. Jacobi polynomials with classical parameters
2. Riemann-Hilbert problem
3. Jacobi polynomials with non-standard parameters
4. Lozenge tilings of hexagon
5. Eynard-Mehta formula
6. Asymptotics of Jacobi polynomials.

- **Course 4**: Multivariate orthogonal polynomials and applications.

  Lecturer: Lidia Fernández (Universidad de Granada, Spain).

  Course overview: Multivariate orthogonal polynomials are not just a simple generalization of the polynomials in a single variable, but they are actually very complex mathematical objects with singular properties. The first part of the course will cover the general properties of orthogonal polynomials in several variables including, for example, recurrence relations, Jacobi matrices or Christoffel-Darboux formulae. Some interesting examples will be analyzed, pointing out the different bases and their particular properties. The final part of the course will focus the applications of these polynomials, such as the relation with optics and aberrations.

- **Course 5**: Diagrammatic and harmonic analysis methods for orthogonal polynomials.

  Lecturer: Luis Velázquez (Universidad de Zaragoza, Spain).

  Course overview: Orthogonal polynomials have links with the study of random walks -more generally, Markov chains- which have been traditionally used to get probabilistic information about such random systems via standard methods from the theory of orthogonal polynomials. These lectures will show some payoffs of this connection which take the form of diagrammatic techniques in orthogonal polynomial theory. Among other things, this diagrammatic approach sheds light on another classical connection which links orthogonal polynomials and harmonic analysis, providing new results in both areas. The course will show some of these results, as well as some open problems posed by this new look at orthogonal polynomial theory.

Organizing Committee:

- Amílcar Branquinho, Universidade de Coimbra, Portugal
- Manuel Domínguez de la Iglesia, Universidad de Alcalá, Spain
- Ana Foulquié Moreno, Universidade de Aveiro, Portugal
- Edmundo Huertas Cejudo, Universidad de Alcalá, Spain
- Alberto Lastra Sedano, Universidad de Alcalá, Spain
- Manuel Mañas Baena, Universidad Complutense de Madrid, Spain

For more information please contact: opsf.s11@uah.es. A dedicated website will be available soon.

Topic #2 ——— OP - SF Net 32.4 ——— July 15, 2025

From: Annie Cuyt (annie.cuyt@uantwerpen.be)
Subject: Announcement: OPERA 2026 Conference in Stirling, Scotland

OPERA: Orthogonal Polynomials, Exponential analysis, Rational Approximation, with Applications

Location: University of Stirling, Scotland, UK

Dates: June 22–26, 2026

We are delighted to invite you to OPERA 2026, a conference aiming to bring together researchers working on topics and applications related to orthogonal polynomials, exponential analysis, and rational approximation. These include, but are not limited to, signal processing applications, computer algebra methods, nonlinear approximation theory, structured matrices and subdivision schemes.

Plenary Speakers:

- Bernard Beckermann, University of Lille, France
- Stefano De Marchi, University of Padua, Italy
- Stefan Güttel, University of Manchester, UK
- Miguel Piñar, University of Granada, Spain
- Gerlind Plonka-Hoch, University of Göttingen, Germany

Scientific Committee:

- Pier Luigi Dragotti, Imperial College London
- Wen-shin Lee, University of Stirling
- David Li, University of Strathclyde
- Ana Loureiro, University of Kent

Stirling, known as the “heart of Scotland” and “Gateway to the Highlands”, is easily accessible from either Edinburgh or Glasgow.

Stay tuned for updates and registration information at opera2026.uk.

Topic #3 ——— OP - SF Net 32.4 ——— July 15, 2025

From: Mark MacLean (macleanm@seattleu.edu)
Subject: Report: TerwilligerFest by **MacLean**

Report on the Combinatorics around the q-Onsager Algebra Conference.

In the last week of June, mathematicians from around the globe convened for the Combinatorics around the q-Onsager Algebra Conference in Kranjska Gora, Slovenia. This conference, also called TerwilligerFEST, was a celebration of the many significant mathematical contributions of Paul Terwilliger on the occasion of his 70^{th} birthday.

The conference featured 46 different speakers, whose talks spanned the wide range of topics Paul’s work has touched on over the years, including distance-regular graphs, association schemes, Leonard pairs,

Figure 1: Organizing and scientific committee members: (Top row) Giusy Monzillo, Mark MacLean, Paul Terwilliger, Stefko Miklavic; (bottom row) Rene Rodriguez Aldama, Blas Fernandez, Safet Penjic.

orthogonal polynomials from the Askey scheme, and the q-Onsager algebra. The full list of the speakers and abstracts can be found at the conference website, https://conferences.famnit.upr.si/event/32/overview.

Beyond the academic discussions, attendees enjoyed the natural beauty of Slovenia, with the conference lecture hall offering stunning floor-to-ceiling views of the Julian Alps. A highlight of the conference was Paul's talk at the banquet, entitled "Fifteen breakthroughs in algebraic combinatorics." He outlined fifteen pivotal mathematical advancements by his peers that profoundly influenced his own research over the course of his career. The evening concluded with many participants sharing touching personal stories about Paul's immense impact on their lives and work.

A special issue of the *Journal of Algebraic Combinatorics* will be devoted to the proceedings of the conference. The organizers would like to extend our gratitude to our sponsors for their financial support: the University of Primorska, the Slovenian Discrete and Applied Mathematics Society, and the Institute of Mathematics, Physics and Mechanics.

Topic #4 ——— OP - SF Net 32.4 ——— July 15, 2025

From: Sergei Suslov (sergei@asu.edu)
Subject: Essay: "$e^{\pi} \approx \pi^{e}$, a brief remark" by **Turbiner** and **Znojil**

$e^{\pi} \approx \pi^{e}$, a brief remark

by: Alexander V. Turbiner and Miloslav Znojil

Figure 2: Group photo of TerwilligerFEST.

This work is dedicated to the memory of the remarkable Czech mathematical physicist Miloslav Havlícek–the exemplary scientist and citizen.

Introduction

The habit of almost all ancient civilizations of denoting numbers by letters survived for a fairly long time. The best example is the ancient Greek numeration system in which the integer value of 1 was denoted by the first letter of the alphabet (with a prime), $\alpha' = 1$ and, similarly, $\beta' = 2$, etc.

One of the very last remnants of such a habit (but using *different* alphabets!) are the numbers $\pi \approx 3.141592654\ldots$ and $e \approx 2.718281828\ldots$. Several persuasive reasons can be found for this. First of all, perhaps, a direct (or indirect) reference has to be made to the famous "Euler's formula" (see also link) [1],

$$e^{\mathrm{i}\pi} + 1 = 0\,, \tag{1}$$

where i is the imaginary unit. While the numerical values of 0, 1 and i are known exactly, both of the transcendentals e and π are only available via an *ad hoc* approximation. Their exact explicit specification is impossible because it would require the knowledge of infinitely many decimal digits. This makes the formula mind-boggling. Second of all, if (-1) in (1) is replaced by i^2, we arrive at

$$e^{\mathrm{i}\pi} = \mathrm{i}^2\,. \tag{2}$$

This can be interpreted as a relation between e, π and i. A natural question to ask is whether there exists a relation between e and π, if i is dropped.

Peculiarity of e and π, main formula

It is truly striking that the numerical values of $\pi \approx 3.141592654$ and $e \approx 2.718281828$ do not in fact lie too far away from each other. Quantitatively, their relative difference

$$2\,\frac{\pi - e}{\pi + e} = 0.14447778\ldots, \tag{3}$$

is comparatively small, about 14%.

Naturally, one must treat this as just an accident and, moreover, about not too striking a coincidence. Still, in our eyes, the situation has thoroughly changed when we more recently noticed that another and truly inspiring parallel surprise emerges when one turns one's attention to the numerical evaluation of the expressions $e^{d\pi}$, for d equal to the smallest Heegner number 1, with

$$e^{\pi} = 23.1406926328\ldots\ . \tag{4}$$

Feeling, not quite expectedly, encouraged by the existence of a part of the decimal expansion of such an exponent in (cf. OEIS sequence A039661) as well as by the existence of its dedicated name (viz., "Gelfond's constant"), we finally found it interesting that expression (4) does not in fact lie too far from its "relative"

$$\pi^{e} = 22.4591577\ldots \tag{5}$$

(see also OEIS sequence A059850). Intuitively, we initially expected that the absolute value of the difference $e^{\pi} - \pi^{e}$ will be very large. Nevertheless, to our great surprise we revealed that the relative difference drops down below 3%,

$$2\,\frac{e^{\pi} - \pi^{e}}{e^{\pi} + \pi^{e}} \ = \ 0.02989198\ldots, \tag{6}$$

cf. (3). We could not resist the impression that the fivefold decrease of the relative difference should be interpreted as simply miraculous. Eventually, we arrive at the approximate equality

$$e^{\pi} \ \approx \ \pi^{e}\ , \tag{7}$$

which holds within 3%. It can be interpreted as a relation between e and π.

Surprisingly, the relation (7) is absent in the Ramanujan notebooks [2][1]. Note that (4) is always larger than (5)[2]. By taking the natural logarithm of the left-hand side and right-hand side of (7), we arrive at an even more accurate approximate equality,

$$\pi \ \approx \ e\,\log_e \pi \ = \ 3.111698447\ldots, \tag{8}$$

where the relative difference

$$2\,\frac{\pi - e\,\log_e \pi}{\pi + e\,\log_e \pi} = \ 0.00956111\ldots, \tag{9}$$

cf. (3), (6), is less than 1%. Note that from (8) an approximate representation for the number e follows,

$$e \approx \ \frac{\pi}{\log_e \pi} \ = \ 2.744396466\ldots, \tag{10}$$

which holds with the same relative difference (9). Note that by taking the logarithm of the left-hand side and right-hand side of (10) we arrive at the approximate representation for the unity,

$$1 \ \approx \ \log_e \pi \ - \ \log_e \log_e \pi \ = 1.009561184\ldots. \tag{11}$$

[1] We thank Prof. B. C. Berndt for this information.

[2] If we take two functions $f_1(x) = e^x$ and $f_2(x) = x^e$: for $x = e$ they coincide, however, with growth $x > e$, it is always $f_1 > f_2$ and their relative difference will slowly increase with x, in particular, for $x = \pi$ the relative difference reaches (6).

Conclusions

The approximate but highly accurate relations (7), (8), (10) and (11) of the Ramanujan style between e and π are presented. Similarly to many relations found by Ramanujan it is unclear how to make our relations more accurate. Such relations could be of natural use while making estimates in science and engineering.

Acknowledgments

AVT thanks Czech Technical University for kind hospitality where this work was finished. AVT wants to express gratitude to W. Bietenholz and J. C. Lopez Vieyra (ICN, UNAM, Mexico) for the interest to the subject and interesting email communications. AVT is partially supported by DGAPA grant IN104125 (Mexico).

Bibliography

[1] Complex Analysis. Lars V. Ahlfors, McGraw-Hill Book Co., New York, 1978.

[2] Ramanujan's Notebooks. Parts I-V, Bruce C. Berndt, Springer-Verlag, New York, 1985.

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Topic #5 ——— OP - SF Net 32.4 ——— July 15, 2025

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 during May and June 2025. This list has been separated into two categories.

OP-SF Net Subscriber E-Prints

http://arxiv.org/abs/2505.00381
Proximal gradient-type method with generalized distance and convergence analysis without global descent lemma
Shotaro Yagishita, Masaru Ito

http://arxiv.org/abs/2505.01344
Multiplicative congruences for Andrews's even parts below odd parts function and related infinite products
Frank Garvan, Connor Morrow

http://arxiv.org/abs/2505.02029
Efficient computation of soliton gas primitive potentials
Cade Ballew, Deniz Bilman, Thomas Trogdon

http://arxiv.org/abs/2505.04378
$\mathbb{Z}_2^3$-grading of the Lie algebra G_2 and related color algebras
N. I. Stoilova, J. Van der Jeugt

http://arxiv.org/abs/2505.05005
A note on the irrationality of $_2(5)$
Li Lai, Johannes Sprang, Wadim Zudilin

http://arxiv.org/abs/2505.05342
Rigorous Methods for Bohr-Sommerfeld Quantization Rules
Joanne Dong, Peter D. Miller, Giorgio Young

http://arxiv.org/abs/2505.05574
Summation formulas for Hurwitz class numbers and other mock modular coefficients
Olivia Beckwith, Nikolaos Diamantis, Rajat Gupta, Larry Rolen, Kalani Thalagoda

http://arxiv.org/abs/2505.06788
Two quantitative versions of the Nonlinear Carleson Conjecture
Sergey A. Denisov

http://arxiv.org/abs/2505.06830
New systems of log-canonical coordinates on $SL(2)$ character varieties of compact Riemann surfaces
Marco Bertola, Dmitry Korotkin, Jordi Pillet

http://arxiv.org/abs/2505.08099
Signed Partitions and Rogers-Ramanujan type Identities
Abdulaziz M. Alanazi, Augustine O. Munagi, Andrew V. Sills

http://arxiv.org/abs/2505.09727
Accelerating Fast Ewald Summation with Prolates for Molecular Dynamics Simulations
Jiuyang Liang, Libin Lu, Alex Barnett, Leslie Greengard, Shidong Jiang

http://arxiv.org/abs/2505.11956
Zeros of linear combinations of orthogonal polynomials
Antonio J. Durán

http://arxiv.org/abs/2505.12633
Asymptotics for a class of planar orthogonal polynomials and truncated unitary matrices
Alfredo Deaño, Kenneth T-R McLaughlin, Leslie Molag, Nick Simm

http://arxiv.org/abs/2505.14441
Orientation Reversal and the Chern-Simons Natural Boundary
Griffen Adams, Ovidiu Costin, Gerald V. Dunne, Sergei Gukov, Oğuz Öner

http://arxiv.org/abs/2505.15330
Zeros of linear combinations of Hermite polynomials
Antonio J. Durán

http://arxiv.org/abs/2505.21917
Structured Divide-and-Conquer for the Definite Generalized Eigenvalue Problem
James Demmel, Ioana Dumitriu, Ryan Schneider

http://arxiv.org/abs/2505.22439
Rigidity of surfaces with nonpositive Euler characteristic by the second eigenvalue of the Jacobi operator
Márcio Batista, Marcos P. Cavalcante, Abraão Mendes, Ivaldo Nunes

http://arxiv.org/abs/2505.22588
Overpartitions and Kaur, Rana, and Eyyunni's mex sequences
Brian Hopkins, James A. Sellers

http://arxiv.org/abs/2505.22896
Exploring Integration by Differentiation
R. D. George, C. Vignat

http://arxiv.org/abs/2505.24530
A Combinatorial Study of the Fixed Point Index
Jesús A. Álvarez López, Alejandro O. Majadas-Moure, David Mosquera-Lois

http://arxiv.org/abs/2506.00810
On the average scale-invariant Cassinian metric
Manas Mohapatra, Antti Rasila, Matti Vuorinen

http://arxiv.org/abs/2506.01865
Some series connecting Fibonacci numbers to
Zhi-Wei Sun, Yajun Zhou

http://arxiv.org/abs/2506.01886
Two $2/5$-level mock theta conjecture-like identities
Stepan Konenkov, Eric T. Mortenson

http://arxiv.org/abs/2506.02190
2-Homogeneous bipartite distance-regular graphs and the quantum group $U_q'(\mathfrak{so}_6)$
Paul Terwilliger

http://arxiv.org/abs/2506.02424
An adaptive delaminating Levin method in two dimensions
Shukui Chen, Kirill Serkh, James Bremer, Murdock Aubry

http://arxiv.org/abs/2506.03003
Newtonian potentials of Legendre polynomials on rectangles have displacement structure
Sheehan Olver

http://arxiv.org/abs/2506.03432
Differential equations for a class of semiclassical orthogonal polynomials on the unit circle
Cleonice F. Bracciali, Karina S. Rampazzi, Luana L. Silva Ribeiro

http://arxiv.org/abs/2506.04918
Orthogonality of polar Legendre polynomials and approximation
Abdelhamid Rehouma

http://arxiv.org/abs/2506.05013
Generalized product formulas for Whittaker's functions and a novel class of index transforms
Semyon Yakubovich

http://arxiv.org/abs/2506.05139
Infinitesimal freeness for orthogonally invariant random matrices
Guillaume Cébron, James A. Mingo

http://arxiv.org/abs/2506.05492
Zeros of orthogonal little q-Jacobi polynomials: interlacing and monotonicity
Andrei Martinez-Finkelshtein, Rafael Morales, Daniel Perales

http://arxiv.org/abs/2506.05622
Deformations of OP ensembles in a bulk critical scaling
Caio E. Candido, Victor Alves, Thomas Chouteau, Charles F. Santos, Guilherme L. F. Silva

http://arxiv.org/abs/2506.05861
Cubic graphs with no eigenvalues in the interval (-2,0)
Krystal Guo, Gordon F. Royle

http://arxiv.org/abs/2506.05961
Generalization of Ramanujan's formula for the sum of half-integer powers of consecutive integers via formal Bernoulli series
Max A. Alekseyev, Rafael Gonzalez, Keryn Loor, Aviad Susman, Cesar Valverde

http://arxiv.org/abs/2506.06101
Ramanujan's partition generating functions modulo ℓ
Kathrin Bringmann, William Craig, Ken Ono

http://arxiv.org/abs/2506.06461
Constructing strong starters of orders $3p$: triplication with SAT solver
Oleg Ogandzhanyants, Sergey Sadov, Margo Kondratieva

http://arxiv.org/abs/2506.06550
A New Two-Sample Test for Covariance Matrices in High Dimensions: U-Statistics Meet Leading Eigenvalues
Thomas Lam, Nina Dörnemann, Holger Dette

http://arxiv.org/abs/2506.09015
Flagged LLT polynomials, nonsymmetric plethysm, and nonsymmetric Macdonald polynomials
Jonah Blasiak, Mark Haiman, Jennifer Morse, Anna Pun, George H. Seelinger

http://arxiv.org/abs/2506.10556
Lambert's problem in orbital dynamics: a self-contained introduction
Lenox Helene Baloglou, Parneet Gill, Tonatiuh Sánchez-Vizuet

http://arxiv.org/abs/2506.10959
Understanding In-Context Learning on Structured Manifolds: Bridging Attention to Kernel Methods
Zhaiming Shen, Alexander Hsu, Rongjie Lai, Wenjing Liao

http://arxiv.org/abs/2506.14259
Dense Phenomena for Ergodic Schrödinger Operators: I. Spectrum, Integrated Density of States, and Lyapunov Exponent
Artur Avila, David Damanik

http://arxiv.org/abs/2506.14738
Partition function of 2D Coulomb gases with radially symmetric potentials and a hard wall
Matthias Allard, Peter J. Forrester, Sampad Lahiry, Bojian Shen

http://arxiv.org/abs/2506.14996
Positive m-divisible non-crossing partitions and their Kreweras maps
Christian Krattenthaler, Christian Stump

http://arxiv.org/abs/2506.17069
Algebra of double cosets of a symmetric group by a smaller symmetric group
Yury A. Neretin

http://arxiv.org/abs/2506.17178
Hecke polynomials for the mock modular form arising from the Delta-function
Kevin Gomez, Ken Ono

http://arxiv.org/abs/2506.17684
Pattern formation Statistics on Fermat Quotients
Cristian Cobeli, Alexandru Zaharescu, Zhuo Zhang

http://arxiv.org/abs/2506.17862
Proofs Of Three Geode Conjectures
Tewodros Amdeberhan, Doron Zeilberger

http://arxiv.org/abs/2506.18712
Lambert series and double Lambert series
Tewodros Amdeberhan, George E. Andrews, Cristina Ballantine

http://arxiv.org/abs/2506.18834
On the random-time and finite-time ruin probability for widely dependent claim sizes and inter-arrival times
Yang Chen, Zhaolei Cui, Yuebao Wang

http://arxiv.org/abs/2506.20289
(Strange) gamma evaluations
Wadim Zudilin

http://arxiv.org/abs/2506.20934
Simplified Airy function Asymptotic expansions for Reverse Generalised Bessel Polynomials
T. M. Dunster

http://arxiv.org/abs/2506.21306
On Uniform Weighted Deep Polynomial approximation
Kingsley Yeon, Steven B. Damelin

http://arxiv.org/abs/2506.22916
Best approximation by polynomials on the conic domains
Yan Ge, Yuan Xu

http://arxiv.org/abs/2506.23082
Hall-Littlewood expansions of chromatic quasisymmetric polynomials using linked rook placements
Jang Soo Kim, Seung Jin Lee, Meesue Yoo

Other Relevant OP-SF E-Prints

http://arxiv.org/abs/2505.01732
Tesler identities for wreath Macdonald polynomials
Marino Romero, Joshua Jeishing Wen

http://arxiv.org/abs/2505.02202
Multiple polylogarithms and the Steinberg module
Steven Charlton, Danylo Radchenko, Daniil Rudenko

http://arxiv.org/abs/2505.03224
Analytic continuation of Kochubei multiple polylogarithms and its applications
Yen-Tsung Chen

http://arxiv.org/abs/2505.03967
Chebyshev polynomials on equipotential curves
Erwin Miña-Díaz, Olof Rubin

http://arxiv.org/abs/2505.04039
Dwork congruences via q-deformation
Pavan Kartik, Andrey Smirnov

http://arxiv.org/abs/2505.04395
A refined q-analogue of some congruences of Van Hamme
Chen Wang, Yu-Chan Tian, Kai Huang

http://arxiv.org/abs/2505.05080
Expectations of some ratio-type estimators under the gamma distribution
Jia-Han Shih

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Hironobu Kimura

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Extreme values of derivatives of the Dedekind zeta function of a cyclotomic field
Zhonghua Li, Yutong Song, Qiyu Yang, Shengbo Zhao

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Tatyana A. Averina, Konstantin A. Rybakov

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A polynomial projective algorithm for convex feasibility problems with positive-definite constraints
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Dirichlet L-functions on the critical line and multiplicative chaos
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An identity for generating series of deformations of multiple zeta values within an algebraic framework
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Some q-transformation formulas and Rogers–Ramanujan type identities
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Neea Palojärvi, Tim Trudgian

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Refined uncertainty relation for q-commutator
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New zero-free regions for Dedekind zeta-functions at small and large ordinates
Sourabhashis Das, Swati Gaba, Ethan Simpson Lee, Aditi Savalia, Peng-Jie Wong

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Krylov and core transformation algorithms for an inverse eigenvalue problem to compute recurrences of multiple orthogonal polynomials
Amin Faghih, Michele Rinelli, Marc Van Barel, Raf Vandebril, Robbe Vermeiren

http://arxiv.org/abs/2506.20150
Values at non-positive integers of partially twisted multiple zeta-functions II
Driss Essouabri, Kohji Matsumoto, Simon Rutard

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On the geometry of a 4-dimensional extension of a q-Painlevé I equation with symmetry type $A_1^{(1)}$
Alexander Stokes, Tomoyuki Takenawa, Adrian Stefan Carstea

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On twisted period functions and Moments of a weighted mean square of Dirichlet L-functions on the critical line
Sebastien Darses, Berend Ringeling, Emmanuel Royer

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Little q-Jacobi polynomials and symmetry breaking operators for $U_q(sl_2)$
Quentin Labriet, Loïc Poulain d'Andecy

http://arxiv.org/abs/2506.24116
On the zero sets of harmonic polynomials
Ioann Vasilyev

Topic #6 ——— OP - SF Net 32.4 ——— July 15, 2025

From: OP-SF Net Editors
Subject: Submitting contributions to OP-SF NET and SIAM-OPSF (OP-SF Talk)

To contribute a news item to OP-SF NET, send e-mail to one of the OP-SF Editors howard.cohl@nist.gov, or spost@hawaii.edu.

Contributions to OP-SF NET 32.5 should be sent by September 1, 2025.

OP-SF NET is the electronic newsletter of the SIAM Activity Group on Special Functions and Orthogonal Polynomials (SIAG/OPSF). 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, and job openings as well as news about new appointments, promotions, research visitors, awards and prizes. OP-SF Net is transmitted periodically through a post to OP-SF Talk which is currently managed and moderated by Howard Cohl (howard.cohl@nist.gov). Anyone wishing to be included in the mailing list (SIAG/OPSF members and non-members alike) should send an email expressing interest to him. Bonita Saunders also posts the Newsletter through SIAM Engage (SIAG/OPSF) which is received by all SIAG/OPSF members.

OP-SF Talk is a listserv associated with SIAG/OPSF which facilitates communication among members, non-members and friends of the Activity Group. To post an item to the listserv,
send e-mail to howard.cohl@nist.gov.

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 (2025-2027) are:
Howard Cohl, Chair
Kerstin Jordaan, Program Director
Tom Trogdon, Secretary

The appointed officers are:
Howard Cohl, OP-SF NET co-editor
Sarah Post, OP-SF NET co-editor
Bonita Saunders, Webmaster and SIAM Engage (SIAG/OPSF) moderator

Topic #7 ——— OP - SF Net 32.4 ——— July 15, 2025

From: OP-SF Net Editors
Subject: Thought of the Month from **Haiti**

"Dèyè mòn, gen mon"

English translation: "Beyond mountains, more mountains"

Haitian proverb.