

# OP-SF NET – Volume 29, Number 4 – July 15, 2022

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

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

OP-SF Net is distributed to OPSF Activity Group members and non-members alike through the OP-SF Talk listserv.

If you are interested in subscribing to the Newsletter and/or OP-SF Talk, or if you would like to submit a topic to the Newsletter or a contribution to OP-SF Talk, please send an email to the OP-SF Net Editors.

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## Calendar of Events:

### July 18–22, 2022

Ramanujan and Euler: partitions, mock theta functions,  $q$ -series  
Virtual Conference and School  
<http://ramanujaneuler.tilda.ws>

### August 8–12, 2022

OPSF–S9: Radboud OPSFA Summer School  
Nijmegen, The Netherlands  
<https://www.ru.nl/radboudsummerschool/courses/2022/opsfa-summer-school/>

### October 22–23 (Saturday–Sunday), 2022

2022 Fall Western Sectional Meeting, American Mathematical Society,  
University of Utah, Salt Lake City, UT.  
Associate Secretary for the AMS Scientific Program: Michelle A. Manes, [mmanes@math.hawaii.edu](mailto:mmanes@math.hawaii.edu).  
*AMS Special Session on Hypergeometric Functions and  $q$ -Series*,  
Organized by Howard Cohl, Robert Maier and Roberto S. Costas–Santos,  
[http://www.ams.org/meetings/sectional/2295\\_progfull.html](http://www.ams.org/meetings/sectional/2295_progfull.html)

### April 1–2 (Saturday–Sunday), 2023

2023 Spring Eastern Virtual Sectional Meeting, American Mathematical Society,  
Associate Secretary for the AMS Scientific Program: Steven H. Weintraub, [shw2@lehigh.edu](mailto:shw2@lehigh.edu).  
*AMS Special Session on Hypergeometric functions,  $q$ -Series and Adjacent Topics*,  
Organized by Howard Cohl, Robert Maier and Roberto S. Costas–Santos,  
[http://www.ams.org/meetings/sectional/2305\\_progfull.html](http://www.ams.org/meetings/sectional/2305_progfull.html)

Topic #1 ——— OP – SF Net 29.4 ——— July 15, 2022

From: Peter Clarkson ([P.A.Clarkson@kent.ac.uk](mailto:P.A.Clarkson@kent.ac.uk))  
Subject: Announcement: Expression of interest in hosting OPSFA17

The next International Symposium on Orthogonal Polynomials, Special Functions and Applications (OPSFA17) is due to be held in 2024. As chair of OPSFA Steering committee, I am seeking expressions of interest in hosting OPSFA17. These should be sent to [P.A.Clarkson@kent.ac.uk](mailto:P.A.Clarkson@kent.ac.uk) by August 31, 2022.

Topic #2 ——— OP – SF Net 29.4 ——— July 15, 2022

From: Eric Mortenson ([etmortenson@gmail.com](mailto:etmortenson@gmail.com))  
Subject: Announcement: Ramanujan and Euler: partitions, mock theta functions,  $q$ -series

This is to announce that there will be an online conference held on 18–22 July, 2022 entitled, “Ramanujan and Euler: partitions, mock theta functions,  $q$ -series.” The invited speakers will be Bruce Berndt, George Andrews, Nikolay Vavilov, Jeremy Lovejoy, Amanda Folsom, Walter Bridges and Ali Uncu. The conference/school website is <http://ramanujaneuler.tilda.ws>. You can register for the conference/school on that website.

A description of the conference/school is now presented. Partitions is a branch of number theory initiated by Leonard Euler. After Euler the subject has been developed by many mathematicians such as Gauss, Jacobi, Schur, MacMahon, Hardy, Ramanujan, Andrews, Ono, etc. Mock theta functions,

an important variants of theta functions, were discovered by the Indian mathematician Ramanujan in the early 20<sup>th</sup> century. The field of partitions is a proving ground where one tests the latest techniques from  $q$ -series and (mock) modularity. The topics of the conferences include but are not limited to the latest developments in  $q$ -series, partitions, modular forms, mock modular forms, and quantum modular forms.

### Topic #3 ——— OP – SF Net 29.4 ——— July 15, 2022

From: Robert Maier ([rsm@math.arizona.edu](mailto:rsm@math.arizona.edu)), Howard S. Cohl ([howard.cohl@nist.gov](mailto:howard.cohl@nist.gov))  
and Roberto S. Costas-Santos ([rscosa@gmail.com](mailto:rscosa@gmail.com))

Subject: Announcement: AMS Special Session: Hypergeometric Functions,  $q$ -Series and Adjacent Topics

For those of you who didn't speak in our OPSFA-16 mini-symposium, we would like to invite you to speak in an AMS Special Session on the same topic that we are organizing. This special session will be held at the in-person [2022 Fall Western Sectional Meeting of the American Mathematical Society](#) (October 22-23, 2022, Saturday-Sunday), University of Utah, Salt Lake City, Utah, USA. It is titled [Hypergeometric Functions,  \$q\$ -Series and Adjacent Topics](#). Regarding this AMS Fall Sectional Meeting, note that we have no travel funds.

In conjunction with our minisymposium at OPSFA-16, this sectional meeting, and a Special Session we are organizing at the [AMS Spring Eastern Virtual Sectional Meeting](#) (April 1-2, 2023), we are organizing a [Contemporary Mathematics](#) (CONM) Proceedings entitled "Hypergeometric functions,  $q$ -Series and Adjacent Topics". We invite you to join us at either of these special sessions and submit a paper for our CONM proceedings. Although we have already received some submissions, the deadline for submitting manuscripts for the Contemporary Mathematics Proceedings will be immediately after the April 1-2, 2023 meeting. For these submissions, CONM is interested in contributions that aren't directed only to a small audience, i.e., ones that might be useful to people newly interested in the field, graduate students, etc. So, it would be a good idea for everyone interested to include background information, citations to classical and modern monographs in addition to recent technical papers, etc. In mathematics journals long bibliographies are sometimes frowned on, but that wouldn't be the case here. In fact, including one or more manuscripts that have a certain expository element, even if it's only summarizing previous work by the author or collaborators, would be reasonable. The AMS Publications Committee would probably like that. Also, each contribution should be a full paper (no "extended abstracts"), but it could be more discursive than a cutting-edge technical paper usually is. For instance, it could spend a lot of time working out the technical details of one or more examples, in addition to including one or more related theorems. Traditionally, proceedings articles, even refereed ones in mathematics, have more leeway that way.

### Topic #4 ——— OP – SF Net 29.4 ——— July 15, 2022

From: Tom Koornwinder ([thkmath@xs4all.nl](mailto:thkmath@xs4all.nl))

Subject: Announcement: **Liz Askey** travel diaries now available

The travel diaries about Dick and Liz Askey's trip to U.S.S.R., Japan, Australia and India during September 1987 – January 1988, written by Liz Askey, are now available in edited form and with explanatory notes. See <https://staff.fnwi.uva.nl/t.h.koornwinder/specfun/#DickAskey>.

From: Andrei Martínez–Finkelshtein ([A\\_Martinez-Finkelshtein@baylor.edu](mailto:A_Martinez-Finkelshtein@baylor.edu))

Subject: Announcement: Postdoctoral Position at Baylor University, Waco, Texas

Baylor University seeks a postdoctoral fellow in Mathematics to start in August 2023. Applications received by November 1, 2022, will receive full consideration. Details for this position can be found at: <https://www.mathjobs.org/jobs/list/20228>

This position is on a renewable twelve-month contract potentially leading to a maximum appointment of three years. Special consideration will be given to applicants with interests aligned with areas of research in the department that include algebra, analysis, applied/computational mathematics, differential equations, mathematical physics, numerical analysis, representation theory, and topology, with potential interdisciplinary applications.

Located in [Waco, Texas](#), Baylor University is the oldest college in Texas. With a population of around 21,000 students, Baylor is one of the top universities in the nation, having just been named an R1 institution by the Carnegie Classification in 2022. Baylor is also on the honor roll of the “Great Colleges to Work For” from The Chronicle of Higher Education. Baylor offers competitive salaries and [benefits](#) while giving faculty and staff the chance to live in one of the fastest-growing parts of the state. Our strategic plan, [illuminate](#), guides the University as we continue to live up to Baylor’s [mission](#) of educating men and women for worldwide leadership and service by integrating academic excellence and Christian commitment within a caring community.

Baylor University is a private not-for-profit university affiliated with the Baptist General Convention of Texas. As an Affirmative Action/Equal Opportunity employer, Baylor is committed to compliance with all applicable anti-discrimination laws, including those regarding age, race, color, sex, national origin, pregnancy status, military service, genetic information, and disability. As a religious educational institution, Baylor is lawfully permitted to consider an applicant’s religion as a selection criterion. Baylor encourages women, minorities, veterans, and individuals with disabilities to apply.

Application Materials Required:

Submit the following items online at this website to complete your application:

- Cover letter
- Curriculum Vitae
- Research statement
- Teaching statement
- Publication list
- Support of Baylor’s mission
- Copy of Official highest degree transcript (required for finalists)
- Latest doctoral transcripts
- Statement indicating Ignite supplemental information submitted
- Reference letter (to be submitted online by the reference writers at this site help popup)

And anything else requested in the position description.

Further Info: <http://www.baylor.edu/math/>

Postdoctoral Search Committee [A\\_Martinez-Finkelshtein@baylor.edu](mailto:A_Martinez-Finkelshtein@baylor.edu).

Topic #6 ——— OP – SF Net 29.4 ——— July 15, 2022

From: Tom Koornwinder ([thkmath@xs4all.nl](mailto:thkmath@xs4all.nl))

Subject: Congratulations to 2022 Fields Medalist **Maryna Viazovska**

The OPSF community congratulates Maryna Viazovska on [her 2022 Fields Medal](#) “for the proof that the  $E_8$  lattice provides the densest packing of identical spheres in 8 dimensions, and further contributions to related extremal problems and interpolation problems in Fourier analysis”. Her work uses techniques which touch to special functions. Actually, she gave a contributed talk “On optimal asymptotic bounds for spherical  $t$ -designs” at [OPSFA-11](#), Madrid, Spain, 2011. Maryna Viazovska originates from Ukraine; she studied in Kiev. She is full professor and Chair of Number Theory at the Institute of Mathematics of the [École Polytechnique Fédérale de Lausanne](#) in Lausanne, Switzerland.

Topic #7 ——— OP – SF Net 29.4 ——— July 15, 2022

From: Andrei Martínez–Finkelshtein ([A\\_Martinez-Finkelshtein@baylor.edu](mailto:A_Martinez-Finkelshtein@baylor.edu))

and Fritz Gesztesy ([Fritz\\_Gesztesy@baylor.edu](mailto:Fritz_Gesztesy@baylor.edu))

Subject: Report by **Gesztesy, Martínez–Finkelshtein**: Baylor Analysis Fest in Waco, Texas



Figure 1: Lance Littlejohn.

The Baylor Analysis Fest, “From Operator Theory to Orthogonal Polynomials, Combinatorics, and Number Theory,” took place during the period May 23–27, 2022, having been delayed from its original date in May of 2020 due to the pandemic. The conference was organized around various topics of Analysis, such as Operator and Spectral Theory, Special Functions, and Orthogonal Polynomials, and their connections with Combinatorics, Probability Theory, and Number Theory. We also celebrated Lance Littlejohn’s accomplishments in mathematics and in building the Mathematics Department at Baylor University for well over a decade.

The conference was organized in a hybrid format and brought together more than 130 researchers from all continents except Antarctica.

The plenary speakers were:

- George E. Andrews (Pennsylvania State University), *Chebyshev polynomials and compositions*;
- David Damanik (Rice University), *Quantum states in random environments*;
- Lance L. Littlejohn (Baylor University), *A Survey of left-definite operator theory with applications to orthogonal polynomials*;
- Ken Ono (University of Virginia), *AGM and jellyfish swarms of elliptic curves*;
- Barry Simon (California Institute of Technology), *A tale of three coauthors: comparison of Ising models*.



Figure 2: Photo of conference attendees.

We also had more than 30 contributed talks, some of them online, a considerable portion by young researchers, including graduate students. Fortunately, the technology worked well, and no serious glitches prevented the audience, both distant and in person, to enjoy the lectures and the discussions.

The social program included an excursion to the Waco Mammoth National Monument.

The conference was sponsored by several organizations, such as the NSF, the Simons Foundation, as well as Baylor University.

More details, pdfs of talks, and video recordings of the lectures can be found at the conference site: <http://www.baylor.edu/math/conference>.

Fritz Gesztesy and Andrei Martínez-Finkelshtein (organizers)

Topic #8 ——— OP – SF Net 29.4 ——— July 15, 2022

From: Sarah Post ([spost@hawaii.edu](mailto:spost@hawaii.edu))  
 Subject: Report by **Post**: OPSFA–16 Plenary Talks

Organized by the [Centre de Recherches Mathématiques of Montréal \(CRM\)](#), the [16<sup>th</sup> International Symposium on Orthogonal Polynomials, Special Functions and Applications](#) took place virtually from June 13 to 17, 2022. Nearly 200 participants attended the Symposium at various times throughout the week. The scientific organizing committee brought in a group of plenary speakers who, as a group, summarized the current state of research in OPSF.

The Symposium is an event of the SIAM activity group on orthogonal polynomials and special functions, which also awards the [Gábor Szegő Prize](#) every two years to an early-career researcher for outstanding research contributions in the area of orthogonal polynomials and special functions. The Gábor Szegő Prize was awarded to Dr. Atul Dixit for his impressive scientific work solving problems related to number theory using special functions, and in particular, research related to the works of Ramanujan. He gave a plenary talk at OPSFA-16 in celebration of this prize he was awarded.

The list of plenary talks for OPSFA-16 are given below:

- Masahito Hayashi, Nagoya University, Nagoya, Aichi, Japan  
*Special functions in quantum statistical estimation;*
- Stefan Kolb, Newcastle University, Newcastle upon Tyne, United Kingdom  
*Quantum symmetric pairs in bivariate continuous  $q$ -Hermite polynomials;*
- Beatrice Pelloni, Heriot-Watt University, Edinburgh, United Kingdom  
*Revivals and Special Functions;*
- Hjalmar Rosengren, Chalmers University of Technology and University of Gothenburg, Gothenburg, Sweden  
*On the Kanade-Russell identities;*
- Peter Paule, Johannes Kepler University, Linz, Austria  
*Holonomic functions and modular forms: an algorithmic bridge;*
- Rinat Kedem, University of Illinois, Urbana, IL, USA  
*Koornwinder operators and integrability of quantum  $Q$ -systems;*
- Nalani Joshi, University of Sydney, Sydney, Australia  
*Motion, monodromy and  $q$ -Riemann Hilbert problems;*
- Tamara Grava, University of Bristol, Bristol, UK  
*The Stieltjes-Fekete problem and degenerate orthogonal polynomials;*
- Alexei Zhedanov, Renmin University of China, Beijing, China  
*From cyclotomic polynomials to polynomials orthogonal on the unit circle;*
- Robert Milson, Dalhousie University, Halifax, Nova Scotia, Canada  
*Classical and exceptional orthogonal polynomials;*
- Anne Schilling, University of California Davis, Davis, CA, USA  
*Plithysm and the algebra of uniform block permutations;*
- Luis Velázquez, Northeastern Illinois University, Chicago, IL, USA  
*Orthogonal polynomials and quantum walks: Schur connections;*
- Atul Dixit, Indian Institute of Technology Gandhinagar, Palaj, Gandhinagar, Gujarat, India  
*Generalized Lambert series.*

Topic #9 ——— OP – SF Net 29.4 ——— July 15, 2022

From: Luc Vinet ([luc.vinet@umontreal.ca](mailto:luc.vinet@umontreal.ca))  
Subject: Report by **Vinet**: OPSFA-16: Askey Day

The special day organized in memory of Richard Askey was certainly memorable. The nine speakers in this Memorial day were able by their presentation to make us travel in time and thus allow us to relive the life of Dick. (Paul Nevai had to cancel his presentation because of a local power outage due to a storm in Ohio, but you will be able to see the slides of his intended presentation on the upcoming website which will be announced). The originally scheduled Askey Day talks were:

- Jacob Stordal Christiansen – *How to compute*;
- Kathy Driver – *Zeros of Jacobi Polynomials*;
- Warren Johnson – *Notes on the Lagrange inversion formula*;
- Tom H. Koornwinder – *Dick and Liz Askey's world trip in the fall of 1987*;
- George Andrews – *Dick Askey in India*;
- Dennis Stanton – *The Askey scheme and Askey-Wilson polynomials*;
- Charles Dunkl – *58 years of special functions and harmonic analysis : Askey as a nucleus of activity*;
- Donald Richards – *Reminiscences of Richard Askey*;
- Paul Nevai – *Those were the days*;
- Shaun Cooper – *What I learned from being a student of Askey*.

The testimonials of all the actors of this day—which included heartwarming remembrances by Dick's daughter Suzanne Askey and also by Mourad Ismail—demonstrated to what extent Dick was a very great mathematician but also a caring, warm and generous person of his time and knowledge. A web page will be set up in the coming weeks by the CRM which will include presentations and photos in order to remember this great researcher. Thank you to all those who made this day a great success, especially Howard Cohl (NIST) and Mourad E. H. Ismail (University of Central Florida).

Comment by H.S. Cohl (with input from Mourad E.H. Ismail): One point which I would like to mention about Dick is that the prevailing feeling, and almost everyone who met him knows this, is that it is widely acknowledged that Askey's knowledge and familiarity with the literature and the works and methods of the mathematical greats was encyclopedic. To be in contact with him was a humbling experience as he was a teacher and mathematician of great magnitude. This was something that you quickly learned and benefited from if you were ever lucky enough to speak with him.

Topic #10 ——— OP – SF Net 29.4 ——— July 15, 2022

From: OP-SF Net Editors  
Subject: OPSFA-16 Minisymposium Reports

In the following subsections we present a collection of reports on the minisymposia which were held at the 16<sup>th</sup> International Symposium on Orthogonal Polynomials, Special Functions and Applications. There were a total of seven minisymposia plus a general session and a Ph.D. student and postdoctoral fellow minisymposium. We will not present reports on the last two minisymposia, but we now present below reports on the other minisymposia.

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From: Paco Marcellán ([pacomarc@ing.uc3m.es](mailto:pacomarc@ing.uc3m.es)) and Juan José Moreno–Balcázar ([balcazar@ual.es](mailto:balcazar@ual.es))  
Subject: OPSFA–16 Minisymposium on Orthogonal Polynomials and Sobolev spaces

The aim of the minisymposium on *Orthogonal polynomials in Sobolev spaces and related topics* was to share some recent trends on this domain. Following the nice experience of the previous OPSFA in Hagenberg, Paco Marcellán (Universidad Carlos III de Madrid) and Juan José Moreno–Balcázar (Universidad de Almería) were in charge of its organization. Structured in three sessions, the contributions were focused on the following topics:

- Analytic properties of Sobolev Orthogonal polynomials on the unit circle (F. Bracciali) and the unit disk (M. Piñar);
- Coherent pairs of measures in the one dimensional case (A. Sri Ranga) and in the matrix case (L. E. Garza) in order to generate families of Sobolev orthogonal polynomials associated with such pairs of measures;
- Sobolev Orthogonal in several variables and their relation with spectral theory of second order partial differential equations (H. Dueñas and M. Marriaga) from a constructive point of view;
- Sobolev–type orthogonal polynomials associated with different ladder operators and the analysis of the corresponding second order differential /difference holonomic equations were studied in the communications by J. F. Mañas and M. N. Rebocho;
- L. L. Littlejohn introduced an interesting approach to one dimensional Krein Laplacian self-adjoint operators and Krein Sobolev sequences of orthogonal polynomials in the framework of discrete–continuous Sobolev inner products;
- The bispectrality of Jacobi type polynomials, which are eigenfunctions of higher–order differential operators, was discussed by (M. D. de la Iglesia);
- Specific Sobolev–type inner products of discrete–continuous case have been presented by M. Sultanakhmedov and their applications in Fourier series and initial value problems for ordinary differential and difference equations related to classical orthogonal polynomials are discussed;
- Pencils of difference and differential operators which appear in a natural way in Sobolev orthogonal polynomials were analyzed in the communication by S. Zagorodnyuk;
- Taking into account the role of semiclassical families of orthogonal polynomials in the Sobolev framework, some illustrative examples were analyzed in the presentation by G. Filipuk where the connection with Painlevé equations was emphasized. Other families of polynomials defined via the generating function are presented by Y. Quintana including a matrix–inversion formula.

The online presentations were done in a friendly atmosphere and some fruitful discussions were implemented.

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From: Dennis Stanton ([stant001@umn.edu](mailto:stant001@umn.edu))  
Subject: OPSFA–16 Minisymposium on Combinatorics of Special Functions

The minisymposium in combinatorics featured 6 talks, 5 on symmetric functions and representation theory, and one on algebraic graph theory. Three were by Jennifer Morse, Marino Romero, and Donghyun Kim on Macdonald polynomials, the shuffle conjecture, and LLT polynomials. Anna Weigandt gave relations for the multiplication coefficients for Schubert polynomials, and Mike Zabrocki spoke about a new connection between characters and a basis for symmetric functions. Paul Terwilliger spoke about compatible pairs of Leonard pair parameters.

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From: Masahito Hayashi ([hayashi@sustech.edu.cn](mailto:hayashi@sustech.edu.cn))  
Subject: OPSFA-16 Minisymposium on OPSF to Quantum Information

In OPSFA-16, I (Masahito Hayashi) have organized minisymposium, “Application of orthogonal polynomials and special functions to quantum information” on 16<sup>th</sup> and 17<sup>th</sup> of June 2022 via online. This minisymposium covers various topics across the group symmetry and quantum information. The following is list of the talks in this minisymposium,

- Programming quantum gates, Giulio Chiribella
- Nonexistence of  $s$ -distance  $2s$ -designs on projective unitary groups, Ziqing Xiang
- A discrete probability distribution expressed by Racah polynomial from Schur-Weyl duality, Shintarou Yanagida
- Representation matching for remote quantum computing, Yuxiang Yang
- Clifford group and  $t$ -designs, Huangjun Zhu
- Tensors: rank, entropy and entanglement, Matthias Christandl
- Learning and testing quantum states, John Wright

$t$ -design is useful tool in quantum information, and has a deep relation with group symmetry. Two speakers, Ziqing Xiang and Huangjun Zhu addressed this topic. Giulio Chiribella and Yuxiang Yang presented results to show how group representation theory works in quantum information processing. Shintarou Yanagida presented how Racah polynomial is generated from Schur-Weyl duality in the relation with quantum information. John Wright discussed learning and testing quantum states by using Schur-Weyl duality. Matthias Christandl discussed the relation of tensor rank with entropy and entanglement. These contents show the importance of use of group symmetry in quantum information. Speakers and participants could actively discussed each other during this minisymposium.

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From: Kerstin Jordaan ([jordakh@unisa.ac.za](mailto:jordakh@unisa.ac.za)) and Peter Clarkson ([P.A.Clarkson@kent.ac.uk](mailto:P.A.Clarkson@kent.ac.uk))  
Subject: OPSFA-16 Minisymposium on Integrable Systems and OPSF

The mini-symposium on “Integrable Systems, Orthogonal Polynomials and Special Functions”, organised by Peter Clarkson and Kerstin Jordaan, comprised of 16 contributed talks over one morning and two afternoon sessions. The theme of the mini-symposium, nicely summarised in its title, was around a selection of areas highlighting the relationship between integrable systems, in particular the Painlevé equations and discrete Painlevé equations, special functions and orthogonal polynomials from both numerical and analytical perspectives. Presentations included contributions on important developments as well as recent results and open problems in the area. The speakers, in order of speaking, were:

- Thomas Bothner – The complex elliptic Ginibre ensemble at weak non-Hermiticity;
- Peter Clarkson – Classical solutions of the fifth Painlevé equation;
- Clare Dunning – On rational solutions of Painlevé equations;
- Robert Buckingham – A Riemann-Hilbert approach for algebraic solutions of the Painlevé-III (D7) equation;

- Pieter Roffelsen – On  $q$ -Painlevé VI, singular Segre surfaces and orthogonal polynomials;
- Marco Bertola – The Padé problem on Riemann surfaces and matrix orthogonal polynomials;
- Peter Miller – The Maxwell–Blach system in the sharp–line limit;
- Nicholas Witte – Gap probabilities for the Bures–Hall ensemble and deformed Cauchy–Laguerre bi-orthogonal polynomials;
- Anton Dzhamay – Recurrence relations for the generalized Laguerre and Charlier orthogonal polynomials and discrete Painlevé equations on the D–6 Sakai surface;
- Sarah Post – Superintegrability, Painlevé transcendents and exceptional orthogonal polynomials;
- Dan Dai – Asymptotics of the deformed Fredholm determinant of the confluent hypergeometric kernel;
- Arno Kuijlaars – Matrix valued orthogonal polynomials and random tiling models;
- Alfredo Deaño – Special function solutions of Painlevé differential equations;
- David Gómez–Ullate – Complete classification of rational solutions of  $A_{2n}$  Painlevé systems;
- Assil Fradi – Ladder operators and differential equations for matrix orthogonal time–dependent Jacobi polynomials;
- Galina Filipuk – Nonlinear differential equations and the geometric approach.

Since the scientific program was entirely online, there were limited opportunities for interaction but fortunately there were some participants not shy to leave their cameras on during the breaks and this allowed everyone to be a part of some interesting mathematical conversations. The image of Marco Bertola, enjoying his sundowner on a veranda with a beautiful view of mountains in the background while engaging in lively discussions with Nicholas Witte and also other participants, will be a lasting memory for many of us.

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From: Erik Koelink ([e.koelink@math.ru.nl](mailto:e.koelink@math.ru.nl))

Subject: OPSFA–16 Minisymposium on Multivariable Special Functions and Representation theory

The minisymposium Multivariable Special Functions and Representation Theory at the OPSFA–16 meeting at CRM consisted initially of 13 lectures, but the lecture by Pablo Roman unfortunately was canceled. The talks in the minisymposium highlighted various interplay between representation theory and special functions. Applications in probability were discussed by Michael Voit (in relation to random walks and spherical functions and the Harish–Chandra integral representation), Leonid Petrov (symmetric functions in relation to stochastic integrable systems), and closely related topic in heat kernels by Piotr Graczyk and Patrice Sawyer, estimating the heat kernel in the Dunkl setting and the related hypergeometric functions. The Dunkl setting also occurred in the lecture of Domink Brennecken on multivariable Bessel functions in the Dunkl setting and the related Hankel transform and in the lecture of Maarten van Pruijssen, where a matrix–valued analogue was discussed using Steinberg’s theorem. E.K. Narayan discussed spherical averages for Gelfand pairs in suitable  $L_p$ –spaces. Stephen Griffeth discussed ongoing work and many conjectures on complex reflection groups and related quotient rings. Jasper Stokman discussed recent developments in extending Macdonald polynomials to have leading terms involving non–integral exponents. Macdonald polynomials and Pieri rules were discussed by Erdal Emsiz in the affine setting. Wolter Groenevelt discussed Askey–Wilson functions arising from tensor product representations of non–compact quantum groups. Plamen Iliev discussed two–variable analogues of Bernstein–Szegő polynomials.

The minisymposium gave a very nice and interesting overview of current development in the area of special functions and representation theory. The main organisational work was done expertly by Margit Rösler, and Jan Felipe van Diejen and I helped out a bit.

Erik Koelink

\* \* \*

From: Walter Van Assche ([walter.vanassche@kuleuven.be](mailto:walter.vanassche@kuleuven.be))  
and Ana Loureiro ([A.Loureiro@kent.ac.uk](mailto:A.Loureiro@kent.ac.uk))

Subject: OPSFA-16 Minisymposium on Multiple Orthogonal Polynomials & Hermite–Padé Approximation

The minisymposium on *Multiple Orthogonal Polynomials and Hermite-Padé Approximation* consisted of 23 talks delivered across four MS sessions whose scope can be briefly categorized by the following topics:

- Luis González, Guillermo López Lagomasino, Sergey Suetin and Maxim Yattselev – Hermite–Padé approximation;
- Sergey Denisov, Vladimir Lysov, Grzegorz Świdorski – Jacobi Matrices on trees;
- Guilherme Silva and Andrei Martínez–Finkelshtein – Equilibrium problems;
- Maurice Duits, Rostyslav Kozhan and Lun Zhang – Random matrices;
- Vasily Prokhorov, Alexander Aptekarev, Alan Sokal and Hélder Lima – Combinatorics;
- Teresa Mesquita, Mikhail Tyaglov, Ana Foulquié Moreno, Hamza Chaggara and Neila Ben Romdhane – Characterizations and special multiple orthogonal polynomials;
- Marija Stanić and Tatjana Tomović Mladenović – Quadrature rules.

The speakers reported on either current or recently published or submitted investigations. Their talks showed that multiple orthogonal polynomials have a rich structure and these special functions have nice applications. In summary, the minisymposium evidenced that multiple orthogonal polynomials and Hermite–Padé approximation is a timely and attractive theme of interest to the OPSF community but also for those working on combinatorics, integrable systems, approximation, numerical analysis, and random matrix theory.

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From: Robert Maier ([rsm@math.arizona.edu](mailto:rsm@math.arizona.edu))

Subject: OPSFA-16 Minisymposium on All Things Hypergeometric,  $q$ -Series and Generalizations

The aim of the OPSFA-16 minisymposium on “All Things Hypergeometric (Classical, Basic and Elliptic),  $q$ -Series and Generalizations” was to bring together a good number of active researchers, from the broad community of people who are knowledgeable about hypergeometric and related special functions, orthogonal polynomials, and  $q$ -series and  $q$ -series identities (of hypergeometric type or not). It was our hope that most of the talks would be of interest to most of the attendees. This minisymposium was organized by myself, Howard Cohl and Roberto Costas–Santos.

The minisymposium was a well-attended success, with 20 talks in all. The talks in the minisymposium were presented by George E. Andrews, Howard S. Cohl, James Mc Laughlin, Robert S. Maier, S. Ole Warnaar, Elena Prilepkina, Gergő Nemes, Victor J. W. Guo, Gaurav Bhatnagar, Dieudonné Mbouna, Michael Schlosser, Roberto S. Costas–Santos, Nasser Saad, Luis Verde–Star, Hans Volkmer, Mourad Ismail (Ruiming Zhang originally planned to give the talk, but was feeling unwell), Heng–Huat Chan, Dmitry Karp, Zeinab Mansour and Javier Segura. Although most speakers attended via

Zoom, there were valuable interactions among the speakers, with some long-published researchers meeting one another for the first time. The topics of the talks ranged over hypergeometric and related functions (extending as far as Heun functions); the application of hypergeometric functions in the theory of continued fractions, the solving of recurrences, and approximation theory; hypergeometric and Meijer  $G$ -function identities;  $q$ -special functions and orthogonal polynomials on lattices;  $q$ -series and theta-function identities; partition and congruence identities; results on asymptotics and bounds; and much more.

Topic #11 ——— OP – SF Net 29.4 ——— July 15, 2022

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 2022. This list has been separated into two categories.

### OP–SF Net Subscriber E–Prints

<http://arxiv.org/abs/2205.00153>

Computation of Large-Genus Solutions of the Korteweg–de Vries Equation  
Deniz Bilman, Patrik Nabelek, Thomas Trogdon

<http://arxiv.org/abs/2205.00480>

On a combinatorial identity of Chaundy and Bullard  
Horst Alzer, Omran Kouba

<http://arxiv.org/abs/2205.00527>

On Finite Analogs of Schmidt’s Problem and Its Variants  
Alexander Berkovich, Ali Kemal Uncu

<http://arxiv.org/abs/2205.01320>

Bernstein inequality on conic domains and triangle  
Yuan Xu

<http://arxiv.org/abs/2205.01479>

Dwork-type congruences and  $p$ -adic KZ connection  
Alexander Varchenko

<http://arxiv.org/abs/2205.03161>

A note on a generalisation of a definite integral involving the Bessel function of the first kind  
S. A. Dar, M. Kamarujjama, R. B. Paris

<http://arxiv.org/abs/2205.03897>

Asymptotics of the deformed Fredholm determinant of the confluent hypergeometric kernel  
Dan Dai, Yu Zhai

<http://arxiv.org/abs/2205.03980>

Dynamical and  $qKZ$  equations modulo  $p^s$ , an example  
Alexander Varchenko

<http://arxiv.org/abs/2205.04867>

A Lagrangian method for indefinite  $q$ -integrals  
Gamela E. Heragy, Zeinab S.I. Mansour, Karima M. Orabya

<http://arxiv.org/abs/2205.05257>

Finite size corrections relating to distributions of the length of longest increasing subsequences  
Peter J. Forrester, Anthony Mays

<http://arxiv.org/abs/2205.05280>

Orthogonal Polynomials of Askey–Wilson Type  
Mourad E.H. Ismail, Ruiming Zhang, Keru Zhou

<http://arxiv.org/abs/2205.06894>

A random walk on the Rado graph  
Sourav Chatterjee, Persi Diaconis, Laurent Miclo

<http://arxiv.org/abs/2205.07068>

On the multiplication operator by an independent variable in matrix Sobolev spaces  
Sergey M. Zagorodnyuk

<http://arxiv.org/abs/2205.07163>

Dingle’s final main rule, Berry’s transition, and Howls’ conjecture  
Gergő Nemes

<http://arxiv.org/abs/2205.07322>

Hook length and symplectic content in partitions  
Tewodros Amdeberhan, George E. Andrews, Cristina Ballantine

<http://arxiv.org/abs/2205.09614>

Zeros in the Character Tables of Symmetric Groups with an  $\ell$ -Core Index  
Eleanor McSpirit, Ken Ono

<http://arxiv.org/abs/2205.11351>

Lambert series of logarithm, the derivative of Deninger’s function  $R(z)$  and a mean value theorem for  $\zeta(\frac{1}{2} - it) \zeta'(\frac{1}{2} + it)$   
Soumyarup Banerjee, Atul Dixit, Shivajee Gupta

<http://arxiv.org/abs/2205.11517>

Monomiality and a New Family of Hermite Polynomials  
Giuseppe Dattoli, Silvia Licciardi

<http://arxiv.org/abs/2205.12800>

Exponentially–improved asymptotics and numerics for the (un)perturbed first Painlevé equation  
Adri B. Olde Daalhuis

<http://arxiv.org/abs/2205.13893>

Anisotropic Hardy–Sobolev inequality in mixed Lorentz spaces with applications to the axisymmetric Navier–Stokes equations  
Yanqing Wang, Yike Huang, Wei Wei, Huan Yu

<http://arxiv.org/abs/2205.14245>

Integrable Differential Systems for Deformed Laguerre–Hahn Orthogonal Polynomials  
Maria das Neves Rebocho, Nicholas S. Witte

<http://arxiv.org/abs/2205.15007>

A Riemann–Hilbert approach to Fredholm determinants of Hankel composition operators: scalar-valued kernels

Thomas Bothner

<http://arxiv.org/abs/2205.15920>

The first eigenvector of a distance matrix is nearly constant

Stefan Steinerberger

<http://arxiv.org/abs/2206.02201>

Some polynomial identities involving binomial coefficients, double and rising factorials and their probabilistic interpretations and proofs

Paweł J. Szabłowski

<http://arxiv.org/abs/2206.04956>

Threshold condensation to singular support for a Riesz equilibrium problem

Djalil Chafaï, Edward B. Saff, Robert S. Womersley

<http://arxiv.org/abs/2206.05104>

On the Positivity of Certain Theta Kernels

Ruiming Zhang

<http://arxiv.org/abs/2206.05177>

$m$ -Symmetric functions, non-symmetric Macdonald polynomials and positivity conjectures

Luc Lapointe

<http://arxiv.org/abs/2206.05222>

Nonterminating transformations and summations associated with some  $q$ -Mellin–Barnes integrals

Howard S. Cohl, Roberto S. Costas–Santos

<http://arxiv.org/abs/2206.05230>

Two-dimensional contiguous relations for linearization coefficients of orthogonal polynomials in the Askey–scheme

Howard S. Cohl, Lisa Ritter

<http://arxiv.org/abs/2206.05346>

Random Walks, Equidistribution and Graphical Designs

Stefan Steinerberger, Rekha R. Thomas

<http://arxiv.org/abs/2206.06509>

Entanglement of inhomogeneous free fermions on hyperplane lattices

Pierre–Antoine Bernard, Nicolas Crampé, Rafael I. Nepomechie, Gilles Perez, Loïc Poulain d’Andecy, Luc Vinet

<http://arxiv.org/abs/2206.06861>

The Stieltjes–Fekete problem and degenerate orthogonal polynomials

Marco Bertola, Eduardo Chavez–Heredia, Tamara Grava

<http://arxiv.org/abs/2206.07320>

Mackey–type identity for invariant functions on Lie algebras of finite unitary groups and an application

Cesar Cuenca, Grigori Olshanski

<http://arxiv.org/abs/2206.07560>

Sobolev–Orthogonal Systems with Tridiagonal Skew–Hermitian Differentiation Matrices  
Arieh Iserles, Marcus Webb

<http://arxiv.org/abs/2206.08375>

A counterexample to a conjecture of M. Ismail  
K. Castillo, D. Mbouna

<http://arxiv.org/abs/2206.08633>

Discrete orthogonal ensemble on the exponential lattices  
Peter J Forrester, Shi–Hao Li, Bo–Jian Shen, Guo–Fu Yu

<http://arxiv.org/abs/2206.09134>

A modular relation involving non–trivial zeros of the Dedekind zeta function, and the Generalized Riemann Hypothesis  
Atul Dixit, Shivajee Gupta, Akshaa Vatwani

<http://arxiv.org/abs/2206.09383>

An expansion for the sum of a product of an exponential and a Bessel function. II  
R. B. Paris

<http://arxiv.org/abs/2206.10308>

A structure relation for some specific orthogonal polynomials  
D. Mbouna

<http://arxiv.org/abs/2206.11007>

An improved discrete Rellich inequality on the half–line  
Borbala Gerhat, David Krejcirik, František Štampach

<http://arxiv.org/abs/2206.11236>

Counting signed derangements with right–to–left minima and excedances  
Yanni Pei, Jiang Zeng

<http://arxiv.org/abs/2206.11798>

Smooth stationary stochastic processes with polynomial conditional moments  
Paweł J. Szabłowski

<http://arxiv.org/abs/2206.12184>

Poisson degenerate central moments related to degenerate Dowling and degenerate  $r$ –Dowling polynomials  
Taekyun Kim, Dae San Kim, Hye Kyung Kim

<http://arxiv.org/abs/2206.13126>

Ergodicity of the Wang–Swendsen–Kotecký algorithm on several classes of lattices on the torus  
Jesús Salas, Alan D. Sokal

<http://arxiv.org/abs/2206.13244>

Using the Jacobi–Trudi formula to compute Stirling determinants  
Tewodros Amdeberhan, Shalosh B. Ekhad

<http://arxiv.org/abs/2206.14950>

Dip-ramp-plateau for Dyson Brownian motion from the identity on  $U(N)$   
Peter J. Forrester, Mario Kieburg, Shi-Hao Li, Jiyuan Zhang

<http://arxiv.org/abs/2206.15434>

A simple algorithm for expanding a power series as a continued fraction  
Alan D. Sokal

## Other Relevant OP-SF E-Prints

<http://arxiv.org/abs/2205.00050>

Fractional powers of first order differential operators and new families of polynomials associated to inverse measures

M. Mazzitelli, P. R. Stinga, J. L. Torrea

<http://arxiv.org/abs/2205.00059>

Fractional Poisson Analysis in Dimension one

Jerome B. Bendong, Sheila M. Menchavez, José Luís da Silva

<http://arxiv.org/abs/2205.00419>

Pro-isomorphic zeta functions of some  $D^*$  Lie lattices of even rank

Yifat Moadim-Lesimcha, Michael M. Schein

<http://arxiv.org/abs/2205.00457>

Metzler/Zeta Correspondence

Yusuke Ide, Takashi Komatsu, Norio Konno, Iwao Sato

<http://arxiv.org/abs/2205.00464>

Quadrature formulas for Bessel polynomials

Hideki Matsumura

<http://arxiv.org/abs/2205.00649>

On the period interpretation for some special values of Thakur hypergeometric functions

Ryotaro Harada

<http://arxiv.org/abs/2205.00879>

An invitation to formal power series

Benjamin Sambale

<http://arxiv.org/abs/2205.01000>

Apéry-Type Series with Summation Indices of Mixed Parities and Colored Multiple Zeta Values, III

Ce Xu, Jianqiang Zhao

<http://arxiv.org/abs/2205.01036>

Instability of pole singularities for the Chazy equation

Satyanad Kichenassamy

<http://arxiv.org/abs/2205.01282>

Witten-Reshetikhin-Turaev invariants and homological blocks for plumbed homology spheres

Yuya Murakami

<http://arxiv.org/abs/2205.01318>

On multi-soliton solutions to a generalized inhomogeneous nonlinear Schrodinger equation for the Heisenberg ferromagnetic spin chain  
Zhou-Zheng Kang, Rong-Cao Yang

<http://arxiv.org/abs/2205.01363>

New analytic solutions in  $f(R)$ -Cosmology from Painlevé analysis  
Genly Leon, A. Paliathanasis, P. G. L. Leach

<http://arxiv.org/abs/2205.01439>

Orbital Stability of Periodic Traveling Waves for the “abcd” Boussinesq Systems  
Gabriel E. Bittencourt Moraes, Guilherme de Loreno, Fábio Natali

<http://arxiv.org/abs/2205.01535>

A review of the Separation Theorem of Chebyshev-Markov-Stieltjes for polynomial and some rational Krylov subspaces  
Tobias Jawecki

<http://arxiv.org/abs/2205.01781>

The time-dependent harmonic oscillator revisited  
Gaetano Fiore

<http://arxiv.org/abs/2205.02051>

Weight distribution of random linear codes and Krawchouk polynomials  
Alex Samorodnitsky

<http://arxiv.org/abs/2205.02337>

General spherical harmonic bra-ket overlap integrals of trigonometric functions  
Giuseppe Lingetti, Paolo Pani

<http://arxiv.org/abs/2205.02931>

Spectral Methods for capillary surfaces described by bounded generating curves  
Ray Treinen

<http://arxiv.org/abs/2205.03022>

Hypergeometric expressions of  $L$ -values for a Borweins theta product of weight 3  
Ryojun Ito

<http://arxiv.org/abs/2205.03102>

Necessary and sufficient stability condition for time-delay systems arising from Legendre approximation  
Mathieu Bajodek, Frédéric Gouaisbaut, Alexandre Seuret

<http://arxiv.org/abs/2205.03397>

Biorthogonal Approach to Infinite Dimensional Fractional Poisson Measure  
Jerome Bendong, Sheila Menchavez, José Luís da Silva

<http://arxiv.org/abs/2205.04242>

Explicit Evaluation of Euler-Apéry Type Multiple Zeta Star Values and Multiple  $t$ -Star Values  
Ce Xu, Jianqiang Zhao

<http://arxiv.org/abs/2205.04576>

Towards the Generalized Riemann Hypothesis using only zeros of the Riemann zeta function  
William D. Banks

<http://arxiv.org/abs/2205.04949>

Two-dimensional diffusion orthogonal polynomials ordered by a weighted degree  
Stepan Orevkov

<http://arxiv.org/abs/2205.05107>

A fully noncommutative analog of the Painlevé IV equation and a structure of its solutions  
Irina Bobrova, Vladimir Retakh, Vladimir Rubtsov, Georgy Sharygin

<http://arxiv.org/abs/2205.05208>

A poset version of Ramanujan results on Eulerian numbers  
Eric Dolores-Cuenca

<http://arxiv.org/abs/2205.05905>

Generalizations and variants of Knuth's old sum  
Arjun K. Rathie, John M. Campbell

<http://arxiv.org/abs/2205.06120>

A Motivic Pairing and the Mellin Transform in Function Fields  
Nathan Green

<http://arxiv.org/abs/2205.06247>

Linear transformations of Srivastava's  $H_C$  triple hypergeometric function  
S. Friot, G. Suchet-Bernard

<http://arxiv.org/abs/2205.06343>

Average capacity of quantum entanglement  
Lu Wei

<http://arxiv.org/abs/2205.06375>

A description of the Zeta map on Dyck paths area sequences  
Viviane Pons

<http://arxiv.org/abs/2205.06503>

The Prime Number Theorem and Pair Correlation of Zeros of the Riemann Zeta-Function  
D. A. Goldston, Ade Irma Suriajaya

<http://arxiv.org/abs/2205.07282>

Random matrix theory and moments of moments of  $L$ -functions  
J. C. Andrade, C. G. Best

<http://arxiv.org/abs/2205.07327>

Systematic construction of non-autonomous Hamiltonian equations of Painlevé-type. III. Quantization  
Maciej Błaszak, Krzysztof Marciniak

<http://arxiv.org/abs/2205.08183>

Hurwitz Zeta Functions and Ramanujan's Identity for Odd Zeta Values  
Parth Chavan

<http://arxiv.org/abs/2205.08466>

On a Ramanujan type expansion of arithmetical functions  
Arya Chandran, K. Vishnu Namboothiri

<http://arxiv.org/abs/2205.08504>

Ramanujan's approximation to the exponential function and generalizations  
Cormac O'Sullivan

<http://arxiv.org/abs/2205.09503>

On the Gross–Prasad conjecture with its refinement for  $(SO(5), SO(2))$  and the generalized Böcherer conjecture  
Masaaki Furusawa, Kazuki Morimoto

<http://arxiv.org/abs/2205.10360>

Restriction theorems and Strichartz inequalities for the Laguerre operator involving orthonormal functions  
Guoxia Feng, Manli Song

<http://arxiv.org/abs/2205.11129>

Polynomial reduction for holonomic sequences and applications in  $\pi$ -series and congruences  
Rong–Hua Wang, Michael X.X. Zhong

<http://arxiv.org/abs/2205.11182>

A note on a stable algorithm for computing the fractional integrals of orthogonal polynomials  
P. Amodio, L. Brugnano, F. Iavernaro

<http://arxiv.org/abs/2205.12530>

Monotonicity, convexity, and inequalities for functions involving gamma function  
Peipei Du, Gendi Wang

<http://arxiv.org/abs/2205.12786>

Multi-sum Rogers–Ramanujan Type Identities  
Zhineng Cao, Liuquan Wang

<http://arxiv.org/abs/2205.13389>

New Hohlov Type Integral Operator involving Clausen's Hypergeometric Functions  
K. Chandrasekran, D. J. Prabhakaran

<http://arxiv.org/abs/2205.14493>

Sign equidistribution of Legendre polynomials  
Ángel D. Martínez, Francisco Torres de Lizaur

<http://arxiv.org/abs/2205.15471>

The zero locus and some combinatorial properties of certain exponential Sheffer sequences  
Gi-Sang Cheon, Tamás Forgács, Arnaud Mesinga Mwafise, Khang Tran

<http://arxiv.org/abs/2205.15594>

Stability of higher order eigenvalues in dimension one  
Jordan Serres

<http://arxiv.org/abs/2205.15798>

Exact solution of the  $\Phi_2^3$  finite matrix model  
Naoyuki Kanomata, Akifumi Sako

<http://arxiv.org/abs/2206.00434>

Conditions for zero-free half-planes of the Zeta Function  
Aditya Ghosh, Kobi Kremnizer, S. Waleed Noor, Charles F. Santos

<http://arxiv.org/abs/2206.00567>

Weak Ramanujan property of the standard non-uniform arithmetic quotient of  $PGL_4$   
Soonki Hong, Sanghoon Kwon

<http://arxiv.org/abs/2206.00880>

Subconvexity of twisted Shintani zeta functions  
Robert Hough, Eun Hye Lee

<http://arxiv.org/abs/2206.00935>

On a continued fraction expansion of the special function and an explicit expression of the continued fraction convergents  
Naoki Murabayashi, Hayato Yoshida

<http://arxiv.org/abs/2206.01031>

Representations of the rank two Racah algebra and orthogonal multivariate polynomials  
Nicolas Crampe, Luc Frappat, Eric Ragoucy

<http://arxiv.org/abs/2206.01124>

The divergence of Mock Fourier series for spectral measures  
Wu-Yi Pan, Wen-Hui Ai

<http://arxiv.org/abs/2206.01491>

On the average behavior of the Fourier coefficients of  $j^{\text{th}}$  symmetric power  $L$ -function over a certain sequences of positive integers  
Anubhav Sharma, Ayyadurai Sankaranarayanan

<http://arxiv.org/abs/2206.01976>

Miscellaneous results related to the Gaussian product inequality conjecture for the joint distribution of traces of Wishart matrices  
Christian Genest, Frédéric Ouimet

<http://arxiv.org/abs/2206.02137>

Approximating the first passage time density from data using generalized Laguerre polynomials  
Elvira Di Nardo, Giuseppe D'Onofrio, Tommaso Martini

<http://arxiv.org/abs/2206.02293>

Mock theta functions and indefinite modular forms  
Minoru Wakimoto

<http://arxiv.org/abs/2206.02302>

One-level density of quadratic twists of  $L$ -functions  
Peng Gao, Liangyi Zhao

<http://arxiv.org/abs/2206.02605>

Convergence in Total Variation for nonlinear functionals of random hyperspherical harmonics  
Lucia Caramellino, Giacomo Giorgio, Maurizia Rossi

<http://arxiv.org/abs/2206.02612>

Towards the Deep Riemann Hypothesis for  $GL_n$   
Ikuya Kaneko, Shin-ya Koyama, Nobushige Kurokawa

<http://arxiv.org/abs/2206.02654>

Distribution of primes and approximation on weighted Dirichlet spaces  
Eva Gallardo-Gutiérrez, Daniel Seco

<http://arxiv.org/abs/2206.03007>

On Binomial coefficients of real arguments  
Tatiana I. Fedoryaeva

<http://arxiv.org/abs/2206.03177>

Intersection numbers of twisted homology and cohomology groups associated to the Riemann-Wirtinger integral  
Yoshiaki Goto

<http://arxiv.org/abs/2206.03350>

Shifted moments of the Riemann zeta function  
Nathan Ng, Quanli Shen, Peng-Jie Wong

<http://arxiv.org/abs/2206.03458>

Block shuffle identities for multiple zeta values  
Minoru Hirose, Nobuo Sato

<http://arxiv.org/abs/2206.03682>

Aspects of the screw function corresponding to the Riemann zeta function  
Masatoshi Suzuki

<http://arxiv.org/abs/2206.03902>

Supersymmetry and Shape Invariance of exceptional orthogonal polynomials  
Satish Yadav, Avinash Khare, Bhabani Prasad Mandal

<http://arxiv.org/abs/2206.04115>

Simplifying Polylogarithms with Machine Learning  
Aurélien Dersy, Matthew D. Schwartz, Xiaoyuan Zhang

<http://arxiv.org/abs/2206.04319>

Approximation in Hankel Sobolev Space by Circular prolate spheroidal series  
Boulsane Mourad

<http://arxiv.org/abs/2206.04821>

Moments of zeta and correlations of divisor-sums: stratification and Vandermonde integrals  
Siegfried Baluyot, Brian Conrey

<http://arxiv.org/abs/2206.05334>

A note on trigonometric approximations of Bessel functions of the first kind and trigonometric power sums  
Luca Guido Molinari

<http://arxiv.org/abs/2206.05610>

A double series for  $\pi$  using Fourier series and the Grothendieck-Krivine constant  
Jean-Christophe Pain

<http://arxiv.org/abs/2206.05612>

Hessenberg–Sobolev Matrices and Favard type theorems  
Hector Pijeira–Cabrera, Laura Decalo–Salgado, Ignacio Perez–Yzquierdo

<http://arxiv.org/abs/2206.05890>

Multinomial probability distribution and quantum deformed algebras  
Fridolin Melong

<http://arxiv.org/abs/2206.06482>

On Rational Solutions of Dressing Chains of Even Periodicity  
H. Aratyn, J.F. Gomes, G.V. Lobo, A.H. Zimerman

<http://arxiv.org/abs/2206.06591>

Period Integrals (Givental’s I–function) of Calabi–Yau Hypersurface in  $CP^{N-1}$  and Intersection Numbers of Moduli Space of Quasimaps from  $CP^1$  with Two Marked Points to  $CP^{N-1}$   
Masao Jinzenji, Kohki Matsuzaka

<http://arxiv.org/abs/2206.07590>

Recurrences for the derivative polynomials for tangent and secant  
Guo–Niu Han, Shi–Mei Ma

<http://arxiv.org/abs/2206.08648>

Orthonormal Expansions for Translation–Invariant Kernels  
Filip Tronarp, Toni Karvonen

<http://arxiv.org/abs/2206.09147>

$\mathcal{R}(p, q)$ –multivariate discrete probability distributions  
Fridolin Melong

<http://arxiv.org/abs/2206.09234>

Analytic continuation of the Lerch zeta function  
Rintaro Kozuma

<http://arxiv.org/abs/2206.10335>

Linear peridynamics Fourier multipliers and eigenvalues  
Bacim Alali, Nathan Albin

<http://arxiv.org/abs/2206.10580>

Non–abelian Painlevé systems with generalized Okamoto integral  
Irina Bobrova, Vladimir Sokolov

<http://arxiv.org/abs/2206.11638>

Riemann surface of the Riemann zeta function  
S. Ivashkovich

<http://arxiv.org/abs/2206.11901>

Enumeration of Tableaux of Unusual Shapes  
Amir Shoan

<http://arxiv.org/abs/2206.12726>

Factorial–Type Recurrence Relations and  $p$ –adic Incomplete Gamma Functions  
Paul Buckingham

<http://arxiv.org/abs/2206.13331>

Transformation formulas for the higher power of odd zeta values and generalized Eisenstein series  
Soumyarup Banerjee, Vijay Sahani

<http://arxiv.org/abs/2206.13893>

A class of special functions using Fourier transforms of orthogonal polynomials on the unit ball  
Esra Gldođan Lekesiz, Rabia Aktař

<http://arxiv.org/abs/2206.14280>

The numerical solution of fractional integral equations via orthogonal polynomials in fractional powers

Tianyi Pu, Marco Fasondini

<http://arxiv.org/abs/2206.14482>

Exact sum rules for spectral zeta functions of homogeneous 1D quantum oscillators, revisited  
Andr Voros

<http://arxiv.org/abs/2206.14586>

Hilbert transform on the Dunkl–Hardy Spaces  
ZhuoRan Hu

<http://arxiv.org/abs/2206.15020>

Exact Green’s functions for localized irreversible potentials

J. I. Castro–Alatorre, D. Condado, E. Sadurn

<http://arxiv.org/abs/2206.15137>

A generalization of Zwegers’  $\mu$ –function according to the  $q$ –Hermite–Weber difference equation

Genki Shibukawa, Satoshi Tsuchimi

<http://arxiv.org/abs/2206.15348>

kStatistics: Unbiased Estimates of Joint Cumulant Products from the Multivariate Faà Di Bruno’s Formula

E. Di Nardo, G. Guarino

Topic #12 ——— OP – SF Net 29.4 ——— July 15, 2022

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](mailto:howard.cohl@nist.gov), or [spost@hawaii.edu](mailto:spost@hawaii.edu).

Contributions to OP–SF NET 29.5 should be sent by September 1, 2022.

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](mailto: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 in–

terest 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](mailto: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](mailto:service@siam.org)

The elected Officers of the Activity Group (2020–2022) are:

Peter Alan Clarkson, Chair

Luc Vinet, Vice Chair

Andrei Martínez-Finkelshtein, Program Director

Teresa E. Pérez, Secretary and SIAM Engage (SIAG/OPSF) moderator

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 #13      OP – SF Net 29.4      July 15, 2022

From: OP-SF Net Editors

Subject: Thought of the Month by **George Andrews**

“It seems to me there’s this grand mathematical world out there, and I am wandering through it and discovering fascinating phenomena that often totally surprise me. I do not think of mathematics as invented but rather discovered.”

**George E. Andrews**, Evan Pugh University Professor of Mathematics, The Pennsylvania State University, University Park, PA.

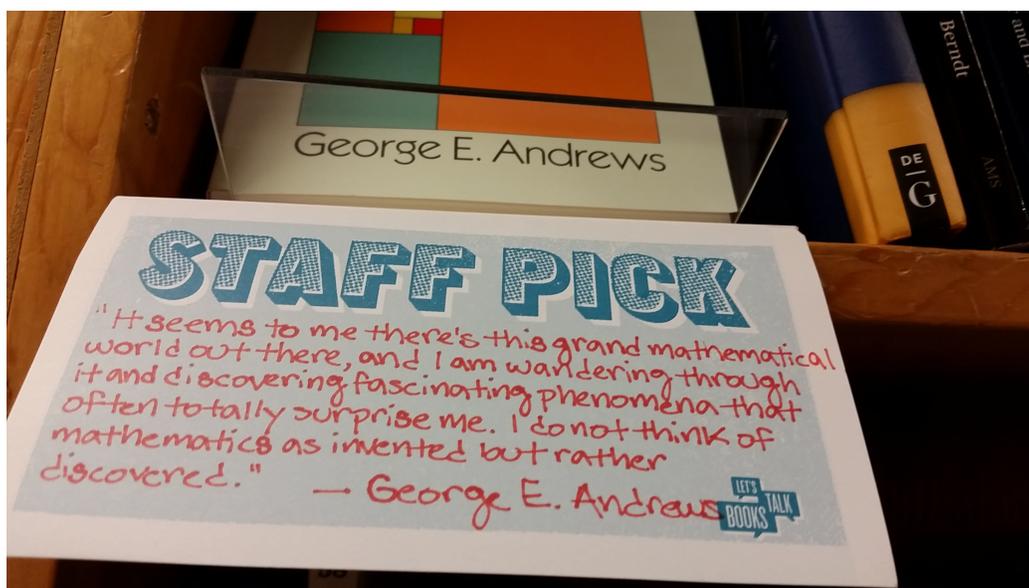


Figure 3: George Andrews’ Classic “Number Theory” displayed in Powell’s Bookstore, Portland, Oregon.