# O P-S F  N E T – Volume 31, Number 1 – January 15, 2024

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.

Editors:
Howard S. Cohl        howard.cohl@nist.gov
Sarah Post            spost@hawaii.edu

Topics:

**Calendar of Events:**

**May 27–31, 2024**

Asymptotics, Randomness, Nonlinearity, and Orthogonality (ARNO 2024)
ARNO 2024 will also be the 2024 Annual Meeting of the PIICQ network,
Leuven, Belgium
https://gsilva.pages.math.cnrs.fr/arno2024/index.html

**June 3–6, 2024**

International Conference on Analysis and Applications
in honor of Roderick S. C. Wong's 80th birthday,
City University of Hong Kong, Hong Kong
https://www.cityu.edu.hk/rcms/icaa2024/index.html

**June 6–9, 2024**

The Legacy of Ramanujan 2024
Celebrating the 85th birthdays of George Andrews & Bruce Berndt,
Penn State University, State College, PA 16801
https://sites.psu.edu/ramanujan/

**June 24–28, 2024**

17th International Symposium on Orthogonal Polynomials, Special Functions and Applications
(OPSFA–17),
Universidad de Granada, Granada, Spain
https://opsfa17.com/

**June 24–28, 2024**

From Classical to Modern Analysis: In memory of Professor José Carlos Petronilho
a Satellite Conference of the 9th European Mathematical Congress,
Sanlúcar de Barrameda, Cadíz, Spain
https://www.mat.uc.pt/~pgsfop/fcma/index.html

**July 8–12, 2024**

Operator Theory and Approximation 2024
TU Wien, Vienna, Austria
https://haraldworacek.github.io/OTA2024/

**September 4–7, 2024**

Approximation Theory and Special Functions (ATSF 2024)
TOBB Economics and Technology University, Ankara, Türkiye
Dedicated to the retirement of George Anastassiou
https://sites.google.com/view/atsf2024

**June 23– 28, 2025**

Combinatorics around the $q$–Onsager algebra
A celebration of the 70th birthday of Paul Terwilliger
Kranjska Gora, Slovenia
https://conferences.famnit.upr.si/event/15/overview

From: Kenier Castillo (kenier@mat.uc.pt) and Francisco Javier García Pacheco (garcia.pacheco@gm.uca.es)
Subject: Announcement: "Classical to Modern Analysis" meeting in Cadíz, Spain on June 24–28, 2024

On August 27, 2021, our friend and colleague José Carlos Petronilho passed away unexpectedly. José Carlos, beyond his extraordinary academic and professional career, was an endearing and down-to-earth person, who was always accessible and who amassed encyclopedic knowledge in Analysis. Although his research area is framed in classical analysis, he was a Professor of functional analysis at the University of Coimbra for more than a decade, which left a deep mark on a large part of his scientific production. The objective of this conference is to honour Professor José Carlos Petronilho by taking a tour of what was his passion for more than 30 years. This event, which will be attended by relatives of Professor José Carlos Petronilho, will be a unique opportunity to remember and honor someone who was an exceptional human being.
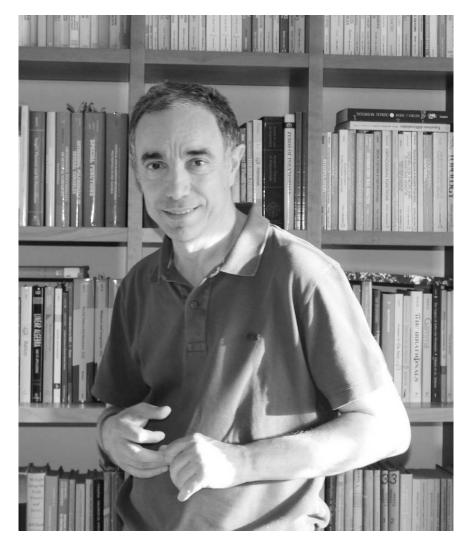


Figure 1: José Carlos Petronilho.

**Conference website**: https://www.mat.uc.pt/∼pgsfop/fcma/

**Dates**: The conference will take place on June 24–28, 2024.

**Venue**: The conference will take place at Auditorio Manolo Sanlúcar, previously Convento de la Merced, built between 1616–1625, in which a hermitage dedicated to the Virgin of Bethlehem has existed since ancient times.

**Registration**: The registration process will be open at December $1^{st}$ . It includes the access to the scientific sessions, an electronic version of the book of abstracts, conference materials, a certificate of attendance, coffee breaks, conference dinner as well as a visit to the archaeological site of Baelo Claudia which includes a lunch (for further information click here).

**Conference Proceedings**: It is planned to publish the conference proceedings in the international Journal of Mathematical Sciences (Springer) which is indexed in Scopus (for more information click here).

**Organizing Committee**:

- Kenier Castillo, University of Coimbra, Portugal, kenier@mat.uc.pt
- Francisco J. García-Pacheco, University of Cádiz, Spain, garcia.pacheco@gm.uca.es
- Fernando León-Saavedra, University of Cádiz, Spain, fernando.leon@uca.es

For any further questions do not hesitate to contact with any of us.

Looking forward to seeing you in Sanlúcar de Barrameda.


# Topic #2 ⸻ OP – SF Net 31.1 ⸻ January 15, 2024


From: Clemente Cesarano (clemente.cesarano@uninettunouniversity.net)
Subject: Announcement: OPSF-S10: Summer School in Rome, Italy on July 29–August 2, 2024

The $10^{th}$ Summer School of OPSFA will be held in Rome form July $29^{th}$ to August $2^{nd}$ . The goal of the school is to provide participants with knowledge, methods and tools related to the field of orthogonal polynomials and special functions, as well as different applications. The 2024 summer school is part of a series of OPSFA-summer school. In the objectives of this Summer School, there is not only the presentation of the classical aspects of orthogonal polynomials and special functions, but also new operational techniques and new approaches related to the unconventional aspects for this field will also be discussed, such as for example the study of orthogonal polynomials in the context of fractional calculus both with the standard method and through the techniques and related formalism of translation operators, the extension of special functions to the complex field and also the use of Sobolev spaces for the definitions of orthogonal polynomials via a different inner product.

Lecturers:

- **Francisco Jose Marcellán Español**, Univeridad Carlos III, Spain,
  *Orthogonal polynomials in weighted Sobolev spaces. Theory and applications*.

- **Nicola Mastronardi**, Istituto Applicazioni Calcolo, CNR, Bari, Italy,
  *Computational Methods for Orthogonal Polynomials and Special Functions*.

- **Mehmet Ali Özarslan**, Eastern Mediterranean University, Northern Cyprus,
  *General bivariate Mittag-Leffler functions and their role in fractional calculus*.

- **Henrik Laurberg Pedersen**, University of Copenhagen, Denmark,
  *Special functions seen from a complex viewpoint*.

- **Paolo Emilio Ricci**, UNINETTUNO University, Italy,
  *Special Functions, polynomials and numbers in the fractional context*.

All the information and the registration form could be found at this link:
https://sites.google.com/uninettunouniversity.net/opsfa-summer-school/home

Clemente Cesarano, The Director of the School, Associate Professor of Numerical Analysis, Section of Mathematics, UNINETTUNO University, Rome, Italy.


## Topic #3 ———— OP – SF Net 31.1 ———— January 15, 2024


From: Michael Schlosser (michael.schlosser@univie.ac.at)
Subject: Announcement: Special SIGMA issue in honor of **Stephen C. Milne**

Dear Colleagues and Friends,

We are writing to invite you to contribute to the special issue of the journal SIGMA on Basic Hypergeometric Series Associated with Root Systems and Applications in honor of Stephen C. Milne's 75$^{th}$ birthday, https://www.emis.de/journals/SIGMA/Milne.html.

Papers can be submitted any time before the deadline of August 31, 2024. Accepted papers will be published online as soon as the final version is available, the paper will be indexed in the relevant databases (MathSciNet, Web of Science, Scopus etc.) as soon as it is published without waiting for completion of the special issue.

We want to emphasise that all papers in this special issue should be original, although exceptional survey papers will be considered. All papers will be subject to the standard refereeing process of SIGMA and, in particular, will be refereed by at least two experts in the field. There is no limit on the length of the articles in the issue.

To submit a paper to this special issue please upload it to https://arxiv.org and email the arXiv number to editor@sigma-journal.com indicating that your paper is intended for this special issue of SIGMA.

If you would like to submit a paper to this special issue, please kindly let the guest editors know beforehand (which shall not cause any obligations) by writing an email to Michael Schlosser at michael.schlosser@univie.ac.at. (If you write that you would like to submit a paper but end up not being able to we will of course understand.)

Best regards,
Gaurav Bhatnagar, Frank Garvan, Christian Krattenthaler and Michael Schlosser
Guest Editors


## Topic #4 ———— OP – SF Net 31.1 ———— January 15, 2024


From: Maria das Neves Robocho (mneves@ubi.pt)
Subject: Report: "Integrable Systems, Random Matrices, and SF at UBI" by **das Neves Robocho**

The workshop **Integrable Systems, Random Matrices, and Special Functions at UBI** was held on the 20$^{th}$ of November 2023 at the Maths Department of University of Beira Interior, Portugal.

Website: https://asimoe1.wixsite.com/workshop

There were six talks:

# Integrable Systems, Random Matrices and Special Functions at UBI

**20 November, 2023**
**University of Beira Interior, Covilhã, Portugal**

- *Baxter biorthogonal polynomials, CMV bispectrality, Szegő mapping and affine Hecke algebra*, by Alexei Zhedanov (Renmin University, China);

- *Matrix valued orthogonal polynomials and Wiener Hopf factoriztion*, by Arno Kuijlaars (KU Leuven, Belgium);

- *Christoffel transform and multiple orthogonal polynomials*, by Rostyslav Kozhan (Uppsala University, Sweden);

- *Banded matrices and their orthogonality*, by Amílcar Branquinho (Coimbra University, Portugal);

- *Picard's Solution to the 6th Painlevé Equation, Diagonal Correlations of the Square Lattice Ising Model and Bi-orthogonal Polynomials on the Unit Circle*, by Nicholas Witte (Victoria University of Wellington, New Zealand & University of Melbourne, Australia);

- *Summations of Bessel functions and their relevance to quantum technology development*, by Miguel Tierz (Complutense University, Spain).

Furthermore, there was a poster session, with the poster *Chasing special biorthogonal rational functions*, by Alphonse P. Magnus (Institut de Mathématique Pure et Appliquée, Université Catholique de Louvain, Belgium), and also the poster *Exchange operators for a spin system of order 3/2, Schrödinger type polynomials and Cartan algebras*, by M. Rouleux (Aix–Marseille Univ., Université de Toulon, CNRS, Centre de Physique Théorique, France).

This meeting was a good opportunity to discuss and exchange ideas around Orthogonal Polynomials, Special Functions and some of their applications. We had a great time! The organisers thank the participants for attending the workshop.

On behalf of the organizers, Maria das Neves Rebocho

Topic #5 ——— OP – SF Net 31.1 ——— January 15, 2024

From: Juan J. Moreno–Balcázar (balcazar@ual.es)
Subject: Report: "The 4th Workshop Dos Días de Polinomios Ortogonales" by **Moreno–Balcázar**

**The 4th Workshop "Dos Días de Polinomios Ortogonales" (Two Days on Orthogonal Polynomials), December 14–15, 2023. Universidad de Almería (Spain).**

This workshop was held at Universidad de Almería last December and it was dedicated to our colleagues Guillermo López Lagomasino (75ᵗʰ anniversary) and Andrei Martínez-Finkelshtein (60ᵗʰ anniversary). Currently, Andrei has a position at Baylor University (USA) and also a partial position at Universidad de Almería, and Guillermo is an honorary professor at Universidad Carlos III de Madrid (Spain). This event was supported by the research group "Approximation Theory and Orthogonal Polynomials", Institute Carlos I for Theoretical and Computational Physics (iC1), Center for Development and Transfer of Mathematical Research to Industry (CDTIME in Spanish), and Department of Mathematics at UAL, and it was organised by Juan F. Mañas-Mañas and myself. The workshop webpage is:

https://w3.ual.es/GruposInv/Tapo/D2PO-2023/D2PO2023.html

The meeting joined 51 researchers on orthogonal polynomials and special functions from Spain. We had 16 invited speakers that tackled different topics such as the history of Verblunsky coefficients, inverse Darboux transformation and Sobolev inner products, Bessel functions, matrix orthogonal polynomials, Zernike polynomials and applications, truncated orthogonal polynomials, exceptional orthogonal polynomials, confluent hypergeometric functions and computation, multiple orthogonal polynomials, coherent pairs of second kind, free probability, constructive approximation and applications, bivariate orthogonal polynomials and Lax-type pairs, Khrushchev measures, etc.



Figure 2: Group photo

On Thursday the 14ᵗʰ, the speakers were Guillermo López, opening the meeting, Manuel Alfaro (Universidad de Zaragoza), Amparo Gil (Universidad de Cantabria), Paco Marcellán (Universidad Carlos III de Madrid), María José Cantero (Universidad de Zaragoza), Teresa Pérez (Universidad de Granada), Juan Carlos García-Ardila (Universidad Politécnica de Madrid), Antonio Durán (Universidad de Sevilla), Óscar Ciaurri (Universidad de La Rioja), and Ramón Orive (Universidad de La Laguna). The morning of Friday 17ᵗʰ began with an amazing visit to the Arabic fortress "La Alcazaba" (whose construction started in the Xᵗʰ century), and the speakers on this day were María Ángeles García-Ferrero (Universidad de Barcelona), Lidia Fernández (Universidad de Granada), Luis Velázquez (Universidad de Zaragoza), Manuel Mañas (Universidad Complutense de Madrid), Alfredo Deaño (Universidad Carlos III de Madrid), and Andrei Martínez-Finkelshtein closing the meeting.

During both days there was also a poster exhibition in the afternoons with 16 contributions. In addition, we gave 5 grants for accommodation to young researchers.

Finally, on Friday night a nice dinner in honor of Andrei and Guillermo was celebrated at Hotel Catedral besides the Cathedral of Almería that this year celebrates its 500th anniversary. It was a very emotional dinner where we gave Guillermo and Andrei a book with their 10 more cited publications according to the database MathSciNet, respectively.

## Topic #6 ——— OP – SF Net 31.1 ——— January 15, 2024

From: Anastasiia Minenkova (minenkova@hartford.edu)
  and Gamal Mograby (gamal.mograby@uconn.edu)
Subject: Report: "JMM 2024 Special Session" by **Minenkova** and **Mograby**

The AMS Special Session on Numerical Analysis, Spectral Graph Theory, Orthogonal Polynomials, and Quantum Algorithms was held in San Francisco, CA, on January 3–4 during JMM 2024.

In this session we brought together speakers from numerical analysis, orthogonal polynomials, spectral graph theory and applications of these areas of mathematics to quantum algorithms.

The program consisted of 16 talks by mathematicians of various stages of their career. It attracted quite a large audience and was followed by active discussions. The presentations were as follows:

- Anastasiia Minenkova, University of Hartford, Linear Algebra in Quantum Computing
- Gamal Mograby, University of Cincinnati, Jacobi operators on graphs: Applications to almost Mathieu operators and Grover's quantum walk
- Radhakrishnan Balu, University of Maryland, 1D self-similar fractals with centro-symmetric Jacobians: asymptotics and modular data
- Rachel Bailey, University of Connecticut, A new perspective on an old example
- Sarah Post, University of Hawaii, Bivariate Racah polynomials and their support graphs
- Chi-Kwong Li, College of William and Mary, Adiabatic quantum computing and graph theory problems
- Hermie Monterde, University of Manitoba, Sedentariness in twin sets of size two
- Hanmeng (Harmony) Zhan, Worcester Polytechnic Institute, Quantum search: an averaging perspective
- Luke Edward Guidry, Rhodes College, Investigating Spectral Behavior through Digraph Move Sequences
- Oliver Knitter, University of Michigan, Applying Variational Quantum and Quantum-Inspired Algorithms to the Linear Complementarity Problem
- Gabor Lippner, Northeastern University, Achieving strong quantum state transfer using a bounded potential
- Christino Tamon, Clarkson University, Is chirality helpful in quantum walk on graphs?
- Maxim S. Derevyagin, University of Connecticut, A reflection on perfect state transfer and related problems in algebra and analysis
- Rafael Morales, Baylor University, Hypergeometric multiple orthogonal polynomials and free finite convolution

- Mihaela B. Vajiac, Chapman University, Orange, CA, The Bicomplex–Real Calculus and Applications to Bicomplex Hermite–Itô Polynomials

- Kate Wall, Brigham Young University, A Chebyshev Subdivision and Reduction Method for Multivariate Root-finding with Quadratic convergence

- Satyajtih Bommana Boyana, University of North Carolina at Greensboro, Novel Discontinuous Galerkin Methods for Optimization Problems with Inequality Constraints

On behalf of the organizers.


# Topic #7 ——— OP – SF Net 31.1 ——— January 15, 2024


From: Gaurav Bhatnagar (bhatnagarg@gmail.com), Atul Dixit (adixit@iitgn.ac.in),
  and Krishnan Rajkumar (krishnan@mail.jnu.ac.in)
Subject: Report: "Topics in SF and NT Seminar Series in 2023" by **Bhatnagar**, **Dixit** and **Rajkumar**

**About the seminar**: This is a report on the seminar on "Topics in Special Functions and Number Theory", organized by Gaurav Bhatnagar (Ashoka University), Atul Dixit (IIT, Gandhinagar) and Krishnan Rajkumar (JNU). We meet approximately once every other week. The current timing is Thursdays, 4:00 – 5:00 PM (IST), though on occasion we deviate as per the speaker's convenience. In case you wish to be informed of future talks, please drop a line to the organizers at sfandnt@gmail.com. The talks in the year 2023 (listed below) are all available on our website https://www.sfnt.org. We welcome suggestions for talks.

The first talk of the new year will be on January 25, 2024, and it is a "Ramanujan Special". This year's speaker is Frank Garvan.

**Talk Announcement**: Ramanujan Special 2024
**Title**: Identities for Ramanujan's Mock Theta Functions and Dyson's Rank Function
**Speaker**: Frank Garvan (University of Florida, USA)
**When**: January 25, 2024, 7:30 PM– 8:30 PM IST (9 AM EST) (Note special time; IST= GMT – 5:30)
**Where**: Zoom: Please write to sfandnt@gmail.com for the link.

**Talks in 2023** The following presented talks in the Seminar in 2023.
  All talks are available on: https://www.sfnt.org.

**Ramanujan Special 2023.** Shaun Cooper (Massey University, Auckland, New Zealand):
Apéry–like sequences defined by four–term recurrence relations: theorems and conjectures.

In addition, the following speakers gave talks. These are (in alphabetic order by last name):

1. Seamus Albion (University of Vienna, Austria): An elliptic $A_n$ Selberg integral.

2. Bruce Berndt (University of Illinois at Urbana Champaign, USA): Finite Trigonometric Sums: Evaluations, Estimates, Reciprocity Theorems.

3. David Bradley (The University of Maine, USA): On Fractal Subsets of Pascal's "Pyramid" and the Number of Multinomial Coefficients Congruent to a Given Residue Modulo a Prime.

4. Bishal Deb (University College, London): The "quadratic family" of continued fractions and combinatorial sequences.

5. Sonika Dhillon (ISI, Delhi, India): Linear independence of numbers.

6. Galina Filipuk (University of Warsaw, Poland): (Quasi)–Painlevé equations and Painlevé equivalence problem.

7. Shashank Kanade (University of Denver, USA): On the $A_2$ Andrews-Schilling-Warnaar identities.

8. Rahul Kumar (Penn State University, USA): Arithmetic properties of the Herglotz-Zagier-Novikov function.

9. Seema Kushwaha (IIIT, Allahabad, India): Farey-subgraphs and Continued Fractions.

10. B. Ramakrishnan (ISI, Tezpur, India): An extension of Ramanujan–Serre derivative map and some applications.

11. A. Sankaranarayanan (University of Hyderabad, India): On the Rankin–Selberg $L$-function related to the Godement–Jacquet $L$-function.

12. Michael Schlosser (University of Vienna, Austria): Bilateral identities of the Rogers–Ramanujan type.

13. Sagar Shrivastava (Tata Institute of Fundamental Research, India): Representations, Determinants and Branching rules.

14. Christophe Vignat (Université Paris–Saclay, CentraleSupélec, Orsay, and Tulane): Dirichlet Series Under Standard Convolutions: Variations on Ramanujan's Identity for Odd Zeta Values.

15. David Wahiche (Université de Tours, France): From Macdonald identities to Nekrasov-Okounkov type formulas

Topic #8 ——— OP – SF Net 31.1 ——— January 15, 2024

From: OP-SF Net Editors
Subject: Remembrances of **André Ronveaux** (1932–2023)

# Remembrances of André Ronveaux (June 19, 1932—December 31, 2023)

Below are remembrances of André Ronveaux from some of his colleagues:

**Alphonse Magnus**; **Wolfram Koepf**; **Norbert Hounkonno**; **Mama Foupouagnigni**; **Iván Area Carracedo** and **Alejandro Zarzo**; **Paco Marcellán**; **Sergei Suslov**.

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## André Ronveaux (1932–2023)

Alphonse Magnus (alphonse.magnus@uclouvain.be)

It is my sad duty to report the passing of André Ronveaux, professor of mathematical physics in Montréal (Canada) and Namur (Belgium). He wrote many papers, many on orthogonal polynomials and as well, books and proceedings, such as

Figure 3: André Ronveaux at Oberwolfach 1983, photo by Tom Koornwinder. Thanks to Hervé Le-Ferrand.

- "Heun's Differential Equations", Oxford University Press, Oxford, 1995, pp. xxiii+354;

- "Polynômes Orthogonaux et Applications", Proceedings of the Laguerre Symposium held at Bar-le-Duc, October 15-18, 1984, Edited by C. Brezinski, A. Draux, A. P. Magnus, P. Maroni et A. Ronveaux, Springer-Verlag, Berlin, Lecture Notes in Mathematics, **1171**, 1985, pp. xxxviii+584;

- "Equations aux différences finies et équations différentielles pour tous: Expérience pilote d'enseignement au Québec (1965-1969) ", André Ronveaux, Préface de Dominique Lambert, Presses Universitaires de Namur, 2017 (a healthy reaction against the 'new math' rage of the period);

- "Introduction aux Equations aux Differences Finies", A. Ronveaux, Lidec, Montréal, 1966, Univ. Montréal, pp. 103 (written for high school students and used in a mathematical summer camp in the province of Quebec: exercises, solved and unsolved).

- "Equations Differentielles Au Secondaire", A. Ronveaux, Lidec, Montréal, 1969, Univ. Montréal, pp. 83 (intended for high school students, this booklet presents derivatives and differential equations without introducing the definite integral, Physical, biological and social applications, worked and unworked exercises).

André was a competent scientist, a devoted teacher, and a benevolent human being.

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Figure 4: Alphonse Magnus and André Ronveaux (right) at Segovia, 1986, photo by Marita Koornwinder.

# André Ronveaux

Wolfram Koepf (koepf@mathematik.uni-kassel.de)

Between October 1995 and June 1998, I was the editor of the Newsletter of the SIAM Activity Group on Orthogonal Polynomials and Special Functions, see
https://www.mathematik.uni-kassel.de/~koepf/siam.html.
In this time I got in contact with many important researchers in the field of Orthogonal Polynomials and Special Functions, one of which was André Ronveaux.

Having the opportunity to organize Session 13 of the "First ISAAC Conference" at the University of Delaware in June 1997 about "Orthogonal Polynomials and Computer Algebra", see
https://www.mathematik.uni-kassel.de/~koepf/isaac.html,
I successfully invited some of the leading experts in the field of Orthogonal Polynomials and Special Functions. The first talk of Session 13 had the title "Recurrence Relations for Connecting Coeffi-cients Between Some Orthogonal Polynomial Families – A Simple Algorithm" and was given by André Ronveaux. Many of his colleagues forming the NaViMa group (shortcut for Namur, where André was professor, Vigo and Madrid) also attended this session. This session was a wonderful experience for me.

At that time André was very active in Africa. One of his PhD students in Benin, Mama Foupouagnigni, jointly with Norbert Hounkonnou, had a DAAD (German Academic Exchange Service) scholarship with the opportunity of a paid stay in Germany, and therefore André asked me in Delaware whether I would be able to host Mama for half a year in Germany. Of course I agreed, and in September 1997 Mama started his very successful stay in Berlin which led to three of our joint papers with André as coauthor. Two more joint papers with André followed until 2004.

I am very indebted to André who initiated my own research in Orthogonal Polynomials and Special Functions, offered me many research ideas and gave me the opportunity to cooperate with him and with Mama Foupouagnigni. We miss him very much!

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# In Memory of André Ronveaux

Mahouton Norbert Hounkonnou (hounkonnou@yahoo.fr)



Figure 5: André Ronveaux on the thesis defence jury for Norbert Hounkonnou.

André Ronveaux, in the company of a few members of his family, embarked in 1989 on an adventure across Africa by car, which brought him to Benin where he met a friend, a professor at the University of Abomey-Calavi, Benin, late Roger Hazoumè. The latter told him about me, a young assistant at the same university, on a doctoral stay at the Catholic University of Louvain, in Belgium. As soon as he returned to Namur, he tried to contact me. I spontaneously responded to his invitation and went to the Laboratoire de Physique mathématique that he directed at the Facultés Universitaires Notre-Dame de la Paix, Namur. There, after some discussions about my scientific ambitions, and the possibility of continuing work on orthogonal polynomials, in conjunction with my main doctoral thesis subject, André adopted me as a son and friend. It was the beginning of a long scientific adventure which was only slowed down when his physical unavailability occurred. André without hesitation entrusted me with supervising the students' tutorials, apart from our joint research work on orthogonal polynomials and special functions. From 1991 to 1995, we published a series of papers in Journal of Physics A: Math. Gen. where we underlined the importance of generalized Laguerre polynomials to describe the Brownian motion of rigid rotators in a bath of oscillators. Which was then followed by a series of works on classical and semi-classical orthogonal polynomials.

André was also a member of my thesis defence jury which took place in November 1992. Our collaboration reached its salient point in 1994, the year when I invited to Benin a certain number of Belgian colleagues including André to help me develop a regional Masters and PhD programs in Mathematical Physics at the Institut de Mathématiques et de Sciences Physiques of Porto-Novo, Benin. This was a task which they carried out brilliantly despite the stifling heat which fell on Benin at this time of the year. That initiative led to the birth of mathematical physics in French-speaking Africa. André took an active part in it and co-supervised master's theses and doctoral theses of students from Benin and other countries in the sub-region. To support the dynamic born from that

Figure 6: André Ronveaux at the dinner following the thesis defence of Norbert Hounkonnou.

training, we initiated in 1999, with the same team and other European and American colleagues, a series of International Conferences on Contemporary Problems in Mathematical Physics, known under the acronym of COPROMAPH International Workshops, which is held every two years in Benin. André played a leadership role in the organization of a Parallel Session on Orthogonal Polynomials and Special Functions.

From 1994 to these last years when his physical unavailability set in, I do not remember a single stay in Europe where I did not schedule a detour to Belgium to work with André. He had an extraordinary passion and enthusiasm for orthogonal polynomials which he communicated with ease to his interlocutors. Despite the difference in age and experience between us, André was a friend, loyal, sincere and faithful, who took my advice and gave unwavering support in a lot of scientific ambitions for Africa. He thus devoted a good part of his life to the service of this continent. Africa and the generation of mathematical physicists that he helped train are grateful to him. Thank you, André, and may your soul rest in peace.

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## My ten best memories with Professor André Ronveaux

Mama Foupouagnigni (mfoupouagnigni@aims-cameroon.org)

**Professor André Ronveaux**, an Emeritus Professor from the "Facultés Universitaires Notre Dame de la Paix", in Namur, Belgium passed away last December 31$^{st}$ 2023, at the age of 91, after having impacted positively so many lives including mine, as his PhD student, scientific son, collaborator and friend. The news of passing away of André came to me as a big shock, although it was predictable as the life of any human being has to come to an end. The following verse from the Holy Quran explains this perfectly: **Every soul shall taste death…** (Surah 29, verses 57-58). In the following lines, I would like to share my ten best memories with André—as we kindly called him—which illustrate clearly the decisive contribution he made in my scientific career.

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1. **First contact: Course on Special functions**. I met André for the first time during the academic year 1994/1995 as a Masters student in the course "Special Functions", he was teaching within the framework of the newly established Master program in Mathematical Physics at the Institute of Mathematics and Physics of the National University of Benin, Porto-Novo, Benin Republic. My studies were supported by the in-country Africa DAAD scholarship.
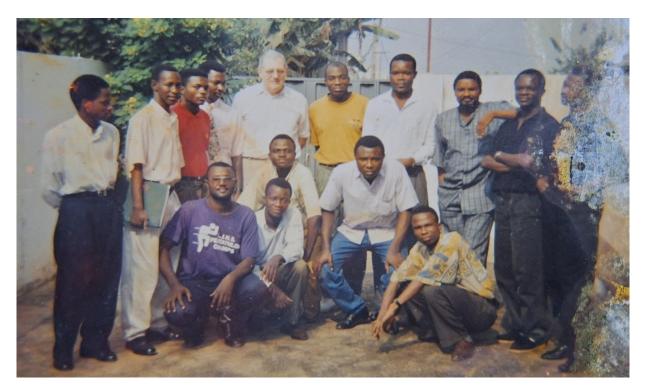


Figure 7: Photo of André and Norbert in Porto-Novo, Benin in November/December 1994 with some students of the Institute of Mathematics and Physics from Benin, Cameroon, DRC and Maurinatine. Upper row, from left to right: Bernardin Kpamegan, Djigo Mamadou, Tsasa Lusala, Carlos Ogouyandjou, André Ronveaux, Ferdinand Ngakeu, Mama Foupouagnigni, Norbert Hounkonnou, Mutuba Luwaba, John Titantah Tatini, Claude Roger Youdom (of blessed memory), Eric Cakpo, Mazita Mombi, Emmanuel Montoki and Lubanzadio Navatikua.

During this course, I was very impressed to see not only how the Hermite polynomials come as solution to the Schrödinger equation but also on the nice properties of this polynomial family including orthogonality and second order differential equation. Among the other lecturers of this Master class in Mathematical sciences who were connected to André, I would like to mention Professors Jean-Pierre Antoine (Belgium), André Pestiaux, Mahouton Norbert Hounkonnou (Benin) and Moïse Godefroy Kwato Njock (Cameroon).

Due to the interest I developed for the many interesting properties and applications of orthogonal polynomials after the course of André and also the course on quantum mechanics by Moïse Godefroy, I asked André if he could supervise my Master thesis and he accepted with pleasure and agreed with Professor Mahouton Norbert Hounkonnou—his close friend, scientific son and collaborator — to act as a local supervisor.

2. **The co-supervision of my Masters these**: André and Norbert co-supervised my Master thesis on the topic "Equations de Laguerre-Freud: Cas des Polynômes Orthogonaux semi-classiques de classe 2". André was mostly doing distance supervision: On a regular basis I send him a Pdf file by email, he prints them out, minute on them and send them back by post

together with photocopies of all the publications I needed to read. I completed the Master Program in December 1995 as the best student of the batch and was naturally accepted as PhD student in the same institute, under the co-supervision of André and Norbert.

3. **The co-supervision of my PhD thesis: Benin, Namur and then Berlin**: André, in collaboration with Norbert gave me a PhD topic in the domain of "Fourth-order Difference Equation for the $r$th Associated and the Laguerre-Freud Equations for the Recurrence Coefficients". Early investigations in my PhD topics revealed the strong need of mastering computer algebra to do the needed calculations and deductions.

4. **Our first joint manuscript**: In between the end of my Master thesis and the beginning of my PhD thesis, André suggested the publication of the main outcome of my Master thesis and the early results of the PhD. I still remember that André produced the first manuscript of this paper by hand written texts within which André could glue equations cut with scissors from the pdf documents he received from me. I then received the written manuscript by post, retype the paper in LATEX and we submitted it for publication in a good journal with the title "Laguerre-Freud equations for the recurrence coefficients of Dω-semi-classical orthogonal polynomials of class one". My first big shock: It was rejected, not in a very polite manner. **André said, Mama, don't worry, we will take into account their feedback and resubmit it elsewhere.**

5. **The search for a German expert in computer algebra and orthogonal polynomials**. Taking into account that my DAAD In-country scholarship has a provision for a six-month stay in Germany, André contacted Professor Wolfram Koepf—expert in computer algebra and orthogonal polynomials—who at that time was working for the ZIB Institute of the Free University in Berlin. Wolfram kindly accepted to be my host in Germany and to deliver the training I needed in computer algebra to complete my PhD thesis. Hence my very successful stay in Berlin from September 1997 till February 1998. During this stay in Berlin, Wolfram got fully involved not only in building my capacity in the mastering and the use of computer algebra for orthogonal polynomials, but also in the mentoring. These efforts contributed in obtaining several new results in orthogonal polynomials and naturally Wolfram became the third co-supervisor of my PhD thesis.

6. **Attending the 8th Symposium on Orthogonal Polynomials and their Applications, Seville, September 1997**. Following the recommendation of André, I attended the above mentioned symposium in Sevilla in September 1997 where our first manuscript was presented enabling me to receive highly relevant feedback from various experts in the domain of orthogonal polynomials. This feedback helped us to significantly improve the original manuscript which was finally accepted in the Proceedings of the Symposium, published as a special volume of Journal of Computational and Applied Mathematics. André also introduced me to most of his colleagues, friends and scientific collaborators of his network who all happen to be experts in the domain of orthogonal polynomials and/or special functions. Among this I can clearly remember: Professors Francisco Marcellán, Eduardo Godoy, Juan Carlos Medem, Stanislas Lewanowicz, Tom Koornwinder, Edward Saff, Herbert Stahl (of blessing memory), Renato Alvarez Nodarse, Walter Van Assche, Richard Askey (of blessed memory), Antonio J. Durán, Theodore Chihara … etc. I returned from this meeting with full confidence and an enlarged network of experts. Also, during this meeting, Ivan Area with whom we quickly and naturally became good friends as the PhD students of two close friends and collaborators, André and Eduardo. Ivan and I have several joint papers and one joint PhD supervised.

7. **Paying a first visit to André in Namur in November/December 1997**. During the visit to André at the "Facultés Universitaires Notre Dame de la Paix" in Namur in November/December 1997, we discussed the early results obtained in Berlin—with the help of computer algebra— in the derivation of the fourth-order differential/difference equations for associated classical

orthogonal polynomials. I remember that even as a retired academic, he managed to pay for my accommodation in Namur. During this visit in Belgium, André and I went to pay a courtesy visit to Professor Alphonse Magnus at the Catholic University of Louvain–la Neuve; we met Alphonse at his office, smoking, if my memory is correct. Then I explained to Alphonse what I was doing in the domain of non–uniform lattices. Then Alphonse made a statement (which unfortunately I don't remember exactly) which I believe was pointing out a result which is more general than what I was working on. **Naively, I asked Alphonse if what he was stating makes sense? That was the end of the courtesy visit: Alphonse stood up and told us in French: "Qui sommes–nous pour questionner du sense des choses?" or Who are we to question the meaning/consistency of things?** I don't remember exactly what happened before André and I left his office, except that later on, Alphonse sent me several "reading papers" and was providing answers to my questions by email. During this visit, André invited me at his home where I had the opportunity to meet his wife.

8. **The defence of my PhD thesis in December 1998**. André attended the defence of my PhD at the Institute of Mathematics and Physics on December 1998 and I still remember that he travelled to Benin Republic from Namur by car, discovering fully an important part of Africa. The final title was: "Laguerre–Hahn Orthogonal Polynomials with respect to the Hahn Operator: Fourth-order Difference Equation for the $r$th Associated and the Laguerre–Freud Equations for the Recurrence Coefficients". I had three co-supervisors for my PhD: André, Norbert and Wolfram.
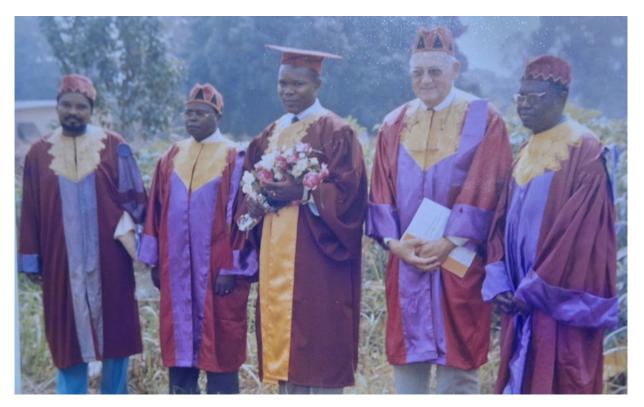


Figure 8: A photo of the Jury members of my PhD defence in December 1998. Left-to-right: Norbert Hounkonnou, Prof. Augustin Banyaga, Mama Foupouag-nigni, André Ronveaux and Prof. Jean-Pierre Ezin.

Figure 9: A family photo with Andre after the defense in December 1998: From left to right: My wife Adjara, André carrying my first daughter Samihra, Mama Foupouagnigni, Prof. Augustin Banyaga and his relative.

9. **Alexander von Humboldt Fellowship change of research interest to OP on a non-uniform lattice**. The quality and number of publications made within the framework of my PhD enabled me to obtain in 2000 the prestigious Alexander von Humboldt Fellowship for a one-year scientific research at the University of Kassel with Wolfram as the host. In December 2001 while in Kassel, I paid another scientific visit to André in Namur during which we discussed on the solutions of the fourth order differential/difference and $q$-difference equation for associated classical orthogonal polynomials. After publishing a series of joint papers connected to my PhD thesis, **I decided to investigate properties of classical orthogonal polynomials on non-uniform lattices as I was convinced that most of the properties I have obtained for the very classical orthogonal polynomials could be generalised to the classical orthogonal polynomials on a quadratic and a $q$-quadratic lattice**. Unfortunately, this change of research orientation slowed down my research collaboration with André as he was not interested in orthogonal polynomials on a non-uniform lattice. The results I obtained proved that I was right as I was able to generalise all the results obtained in my PhD for very classical orthogonal polynomials to the classical orthogonal polynomials on a non-uniform lattice. I ended up writing my German Habilitation thesis in this new domain (Classical Orthogonal polynomials of a non-uniform lattice) which I completed at the University of Kassel in June 2016. Moreover, I have supervised 4 PhD theses which emerged directly from this topic.

10. **Dedicating one of my most important paper for André 80th birthday**. André was very happy when I dedicated to him for his 80th birthday one on my most important papers on a non-uniform lattice: M. Foupouagnigni, M. Kenfack Nangho, S. Mboutngam (2011), Characterization theorem for classical orthogonal polynomials on non-uniform lattices: the functional approach, Integral Transforms and Special Functions, 22:10,739-758.

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11. **Finally, I want to conclude by saying that André has played a decisive role in my academic career as a mentor, father, collaborator and a friend.** Fortunately, I dedicated to him when he was alive and in good health one of my best scientific paper and this brought to him a lot of happiness. I have supervised in total six PhD students, and those are all scientific grand-children of André. There is some ongoing PhD supervision, clear proof that even after André has died, his scientific impact will remain alive for a very long period.

Rest in Perfect Peace André. This was Mama Foupouagnigni, your former PhD student from Cameroon.

⋆ ⋆ ⋆

# André Ronveaux (Nimy, 19 June 1932; Laeken, 31 December 2023)

Iván Area Carracedo (area@uvigo.gal) and Alejandro Zarzo (alejandro.zarzo@upm.es)

In early January 2024, we received the sad news of the demise of our dear friend, colleague, and "maestro" André Ronveaux. We were fortunate to spend many years of coexistence and learning with this good and generous person who had actually baptised our research team, NAVIMA, an acronym formed with the first syllables of the three cities where we had worked: Namur, Vigo and Madrid. Our collaboration with André dates back to the 1990s and continued until about 6 years ago, during which time we wrote a number of articles and book chapters together, and above all learned from his many teachings about life and its surroundings.



Figure 10: The NAVIMA group: Eduardo Godoy, Alejandro Zarzo, André Ronveaux, and Iván Area. Vigo, 2000.

Working on articles was a prime task but there were moments of conversation and reflection on important topics such as development cooperation or geopolitical equilibrium, and especially, the family spirit. A family that André loved dearly and shared with us, besides his teachings and experiences. As we pen down these lines, we remember our first visit to his house for dinner. André gave to one of us a bottle opener to open a bottle of wine. He first used his right hand and seeing

that it would not work, he then tried with his left hand. And Voila!, this was a bottle opener for left-handed people. We did not realise then, that in addition to opening the bottle, the task was also a small test to see his ability for improvisation in unforeseen situations. What was predictable in these unforgettable conversations during our visits to Namur was the presence of exquisite Belgian beers and his irreplaceable conversations, but alas! André is no more with us now.

We had the opportunity to meet and work in the three cities thanks to a NATO Collaborative Research Grant. Continuity was later facilitated through other sources of funding. Every time we visited André in Namur, he would come to pick us up in his van. The same van that accompanied him years later on his Namur-Dakar (Senegal) trip with his wife. Unfortunately, the van could not make it back and had to be left behind, since the return trip to Namur meant thousands of kilometres, and it was a wonder that the van had actually reached Dakar. The much time spent together in Namur, Madrid and Vigo knit us as a team, compounded by the different congresses we attended, among which we'd like to highlight the several OPSFA. His speeches at congresses and scientific meetings impressed all those present, and fortunately, there were many of such events to enjoy. André was an expert at recycling material and transparencies from earlier communications. His shuffling through transparencies during talks, created an ambience of chaotic order, or ordered chaos, that is difficult to express. These congresses contributed not only to the growth of André's network of collaborators and friends, but also the team benefiting from new approaches for solving classical problems.

The early days bring back memories of sending and receiving faxes, as well as waiting patiently in front of the only computer connected to the Internet, to check if there was any mail from André. That pace of work gave us the time to think and reflect on problems at hand that we tried to define and resolve during our in-person meetings. We fondly remember our first visits to the Math-Phys Lab at the Facultés Universitarias de Notre-Dame-de-la-Paix (FUNDP) in Namur. It was in those early days that we made a decision to take turns at authorship of our publications, identified as Navima Preprint, and we had designed a numerical code (that only we knew!). It was endearing and fun. André's interest in symbolic calculus also dates back to those times. He was, in fact, a visionary who, in the early 1990s, clearly envisaged the importance of such tools for orthogonal polynomials and special functions. His intuition led us to acquire the first Mathematica license, which at the time, came with a huge explanatory manual of the different commands.

Shortly after turning 65, André Ronveaux had the possibility of obtaining the status of emeritus professor. He obviously thought that he would continue using his office and have access to the library at the FUNDP. However, unfortunately, the university moved all his books from his office to a corridor, which he coined as the "Ronveaux corridor". Not only did he not have an office, but they also took away something he deeply loved: access to the library that he needed for his research. These were very difficult times for André, who always desired to continue working. He refused to quit and finally found a solution to the library and work space problem. A solution that can be described as "truly Ronveauxian", which consisted of registering for a second PhD thesis to study the history of orthogonal polynomials. This gave him access to the library, which today is part of the Université Catholique de Louvain, and also a table in a shared office. He would jokingly say that he had to hurry up with his thesis since his thesis supervisor, Jean Mawhin, was about to retire. The NAVIMA members will always be grateful to Jean, as well as his colleagues at the Université Catholique de Louvain. We feel that this part of his story deserves mention for several reasons: as a mark of respect for his problem solving spirit to seek solutions for complex problems; as a sign of his passion for researching the world of orthogonal polynomials and special functions, as well as for other reasons that we choose not to mention but memories of which will stay with us forever.

On his last visit to Vigo, we went to pick him up at the hotel to take him to the airport, which was possibly his last time in Vigo. We were told by reception that he had not yet had breakfast. When André finally came to the reception, he told us that he had placed his alarm clock upside down and had spent all night dreaming that time was moving backwards, and that he could travel back in

time to see loved ones he had recently lost. We would like to have now that magical clock and have the possibility to enjoy André's teachings again.

There is no doubt that people's lives are full of wonderful events that make lasting memories. To us, having André as a friend, colleague and maestro made an everlasting impression on us. Even though serious injustices of all kinds also occur on a daily basis, the discrimination experienced by our maestro during the last years of his life is beyond doubt, one of them.

NA†VIMA, Iván Area and Alejandro Zarzo

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# André Ronveaux (1932–2023). In memoriam

Paco Marcellán (pacomarc@ing.uc3m.es)

In the first days of the New Year we have received from Alphonse Magnus the sad news concerning our friend André Ronveaux who passed away in December 31, 2023.

I met André in 1981 in Luxemburg in occasion of a meeting of the Groupement des Mathématiciens d' Expression Latine, an initiative to promote the scientific links between mathematicians from Portugal, France, Spain, Italy, Romania, Switzerland and Belgium. After that, we attended the Bar–le–Duc conference on Orthogonal Polynomials and their Applications in 1984. Edmond Nicolas Laguerre was born there in 1834 and Bar–le–Duc was the right place to honor him. André was a member of the Organizing Committee with Claude Brezinski, André Draux, Alphonse Magnus and Pascal Maroni. The meeting allowed the consolidation of the community of orthogonal polynomials, special functions and their applications (OPSFA, in short) and was the starting point of a biennial symposia series. The $17^{th}$ edition will take place in Granada in June 2024 and we have suggested to the organizers to reminisce these past 40 years of nice international cooperation with a special lecture.

In 1987 I started a fruitful scientific cooperation with André, involving colleagues from Spanish universities such as Zaragoza (M. Alfaro, M. L. Rezola), Granada (J. S. Dehesa, T. E. Pérez, M. Piñar), Politécnica de Madrid (A. Zarzo), Vigo (E. Godoy, I. Area), Carlos III de Madrid (L. Salto), Sevilla (R. Alvarez–Nodarse, N. Rodriguez–Quintero), as well as others. Among various topics, we were particularly interested in the study of Sobolev orthogonal polynomials from the pioneering work of Dutch mathematicians such as H. G. Meijer, H. Bavinck, and R. Koekoek, who were a source of inspiration for us.

We jointly published several contributions in the framework of so called Sobolev–type orthogonal polynomials which constituted a new point of view in the theory. In particular, I am very proud of two papers published in the SIAM Journal of Mathematical Analysis. The first one (with M. Alfaro and M. L. Rezola) is "On orthogonal polynomials of Sobolev type: Algebraic properties and zeros", SIAM Journal on Mathematical Analysis, **23** (1992), 737–757, where we analyzed analytic and algebraic properties of such polynomials. In the second one (with D. Evans, L. L. Littlejohn and C. Markett) "On recurrence relations for Sobolev polynomials", SIAM Journal on Mathematical Analysis, **26** (1995), 446–467, the connection between symmetric operators, recurrence relations and spectral problems was stated in the framework of Sobolev inner products.

I visited Namur several times and very much enjoyed the kind atmosphere generated by André in his office, where there was a very good library on mathematics and mathematical physics. I enjoyed as well, the scientific discussions in the long seminars drinking Belgian beers in the André's favorite places in the city. I appreciated very much that his house was always open to me and other visitors. Therein we greatly enjoyed the warm and friendly hosting of his wife Marie-France and his five children.

André also spent some time in the above mentioned Spanish universities (at least one or two visits per year) and he attended several meetings we organized in the period 1987–2004 in order to consolidate a powerful community of Spanish mathematicians in OPSFA. The group NAVIMA was a good sample of the permanent interest by André to promote the progress of knowledge in the different topics of his scientific interest.

I would like to emphasize that André has contributed to create a solid mathematical community not only in Europe but also in Africa, promoting exchanges with people from Cameroon, Bénin and Maghreb, among others. We were very proud to enjoy André's friendship, but must also emphasize our recognition for the learning experience we received from his open mind concerning Science and Life.

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## In memory of a colleague...

Sergei Suslov (sergei@asu.edu)

The sad news of André Ronveaux's death has reminded me of the time that he came to visit me in Moscow during the mid 1980's. He came as a tourist together with his wife. At that time, we had already exchanged articles by mail, and he had sent me his book. But we had never met in person. Actually, André was one of the first foreigners I ever had a chance of meeting in person (except for Dick Askey and Mourad Ismail). At the time of André's visit, I was working at the Kurchatov Institute of Atomic Energy, and I had never imagined or had a clear perspective of going abroad.

We picked up André and his wife at his hotel and spent a lovely evening at my apartment in Krylatskoe, one of Moscow's suburbs. We had dinner with my other friends and colleagues from the Kurchatov Institute. At that time, André was about the age of my father. However, he was a great looking, friendly, optimistic and handsome man from another side of the "iron curtain".

That night, at dinner, since it's a tradition for Russian families that all guests should be well-fed, when André was asked if he would like some hot Siberian (second course) pelmenies, he improvised "just one". This was a funny joke which referred to the title of the recent Marilyn Monroe movie "Some Like it Hot" (in Russian, the title was different "В джазе только девушки"). This was a good time that we all spent together, with friendly conversations and many jokes.

Later when the climate between countries improved, we met at several conferences in Europe and North America. But I will forever remember his visits to Moscow as a "scientific ambassador" from the western world. Thank you André, if I may...

Respectfully, Sergei

Topic #9 ——— OP – SF Net 31.1 ——— January 15, 2024

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 November and December 2024. This list has been separated into two categories.

# OP-SF Net Subscriber E-Prints

http://arxiv.org/abs/2311.00261
$q$-Fractional Integral Operators With Two Parameters
Mourad E. H. Ismail, Keru Zhou

http://arxiv.org/abs/2311.02135
Transitive subtournaments of $k$-th power Paley digraphs and improved lower bounds for Ramsey numbers
Dermot McCarthy, Mason Springfield

http://arxiv.org/abs/2311.03135
Generalized integrals and point interactions
Jan Dereziński, Christian Gaß, Błażej Ruba

http://arxiv.org/abs/2311.03256
$\lambda$-Griffiths polynomials: Bispectrality and biorthogonality
N. Crampé, L. Frappat, J. Gaboriaud, E. Ragoucy, L. Vinet, M. Zaimi

http://arxiv.org/abs/2311.04853
Asymptotic zeros' distribution of orthogonal polynomials with unbounded recurrence coefficients
Grzegorz Świderski, Bartosz Trojan

http://arxiv.org/abs/2311.05095
A Bessel Analog of the Riesz Composition Formula
Christoph Fischbacher, Fritz Gesztesy, Roger Nichols

http://arxiv.org/abs/2311.05238
Higher order Thorin-Bernstein Functions
Henrik Laurberg Pedersen, Stamatis Koumandos

http://arxiv.org/abs/2311.05636
On classical orthogonal polynomials on bi-lattices
K. Castillo, G. Filipuk, D. Mbouna

http://arxiv.org/abs/2311.05785
On Strong Zero-Dispersion Asymptotics for Benjamin-Ono Soliton Ensembles
Elliot Blackstone, Louise Gassot, Peter D. Miller

http://arxiv.org/abs/2311.05949
Lax-type pairs in the theory of bivariate orthogonal polynomials
Amílcar Branquinho, Ana Foulquié-Moreno, Teresa E. Pérez, Miguel A. Piñar

http://arxiv.org/abs/2311.07657
The Riemann zeta function and exact exponential sum identities of divisor functions
Maria Nastasescu, Nicolas Robles, Bogdan Stoica, Alexandru Zaharescu

http://arxiv.org/abs/2311.09771
Essential self-adjointness of even-order, strongly singular, homogeneous half-line differential operators
Fritz Gesztesy, Markus Hunziker, Gerald Teschl

http://arxiv.org/abs/2311.10124
Novel Formulas for B-Splines, Bernstein Basis Functions and special numbers: Approach to Derivative and Functional Equations of Generating Functions
Yilmaz Simsek

http://arxiv.org/abs/2311.10310
Schwarz Lemma and Schwarz-Pick Lemma for solutions of the $\alpha$-harmonic equation
Ming Li, Xiu-Shuang Ma, Li-Mei Wang

http://arxiv.org/abs/2311.11326
On Pólya's random walk constants
Robert E. Gaunt, Saralees Nadarajah, Tibor K. Pogány

http://arxiv.org/abs/2311.11747
Coefficientwise Hankel-total positivity of the Schett polynomials
Bishal Deb, Alan D. Sokal

http://arxiv.org/abs/2311.11805
Asymptotics for $d$-fold partition diamonds and related infinite products
Kathrin Bringmann, William Craig, Joshua Males

http://arxiv.org/abs/2311.11886
Lerch $\Phi$ asymptotics
A. B. Olde Daalhuis

http://arxiv.org/abs/2311.12451
A frame approach for equations involving the fractional Laplacian
Ioannis P. A. Papadopoulos, Timon S. Gutleb, José A. Carrillo, Sheehan Olver

http://arxiv.org/abs/2311.12625
The $m$-symmetric Macdonald polynomials
Manuel Concha, Luc Lapointe

http://arxiv.org/abs/2311.12761
Lecture hall graphs and the Askey scheme
Sylvie Corteel, Bhargavi Jonnadula, Jonathan P. Keating, Jang Soo Kim

http://arxiv.org/abs/2311.13083
Meijer's $G$-function and Euler's differential equation revisited
Fritz Gesztesy, Markus Hunziker

http://arxiv.org/abs/2311.13392
Generalization of Plemelj's Formula for Dini Continuous Functions
Nick Castillo, Ovidiu Costin, Kriti Sehgal

http://arxiv.org/abs/2311.13407
Lozenge Tilings of a Hexagon and q-Racah Ensembles
Maurice Duits, Erik Duse, Wenkui Liu

http://arxiv.org/abs/2311.15554
Orthogonal polynomials on domains of revolution
Yuan Xu

http://arxiv.org/abs/2311.16596
Continued fractions of cubic irrationalities
Wadim Zudilin

http://arxiv.org/abs/2311.18109
Multivariate Meixner polynomials related to holomorphic discrete series representations of $\mathrm{SU}(1,d)$
Wolter Groenevelt, Joop Vermeulen

http://arxiv.org/abs/2312.01620
The Laplace Beltrami operator on the ellipsoid
Hans Volkmer

http://arxiv.org/abs/2312.01976
Calogero–Moser eigenfunctions modulo $p^s$
Alexander Gorsky, Alexander Varchenko

http://arxiv.org/abs/2312.02384
The Akhiezer iteration
Cade Ballew, Thomas Trogdon

http://arxiv.org/abs/2312.02890
On Matrices Arising in Finite Field Hypergeometric Functions
Satoshi Kumabe, Hasan Saad

http://arxiv.org/abs/2312.02933
Hook lengths in self–conjugate partitions
Tewodros Amdeberhan, George E. Andrews, Ken Ono, Ajit Singh

http://arxiv.org/abs/2312.04340
Orthogonality of a new family of $q$–Sobolev type polynomials
Neha, A. Swaminathan

http://arxiv.org/abs/2312.05137
Uvarov Perturbations for Matrix Orthogonal Polynomials
Gerardo Ariznabarreta, Juan C. García–Ardila, Manuel Mañas, Francisco Marcellán

http://arxiv.org/abs/2312.08312
Factorized $A_2$–Leonard pair
Nicolas Crampé, Meri Zaimi

http://arxiv.org/abs/2312.08896
Spectral Moments of the real Ginibre ensemble
Sung–Soo Byun, Peter J. Forrester

http://arxiv.org/abs/2312.09931
Connection formulae for orthogonal polynomials when the measure is modified by an even factor
A. S. Jooste, K. Jordaan

http://arxiv.org/abs/2312.09973
A Finite–Bound Partition Equinumerosity Result Generalizing a Solution of a Problem Posed by Andrews and Deutsch
Michael J. Schlosser, Nicolas Allen Smoot

http://arxiv.org/abs/2312.11081
Lattice paths and branched continued fractions. III. Generalizations of the Laguerre, rook and Lah polynomials
Bishal Deb, Alexander Dyachenko, Mathias Pétréolle, Alan D. Sokal

http://arxiv.org/abs/2312.12221
On the multipeakon system of a two-component Novikov equation
Xiang-Ke Chang, Jacek Szmigielski

http://arxiv.org/abs/2312.11294
Special Function Solutions of Painlevé-IV and the Quartic Model
Ahmad Barhoumi

http://arxiv.org/abs/2312.12603
Bounded Connected Components of Polynomial Lemniscates
Adam Kraus, Brian Simanek

http://arxiv.org/abs/2312.12992
Extremal polynomials and polynomial preimages
Jacob S. Christiansen, Benjamin Eichinger, Olof Rubin

http://arxiv.org/abs/2312.14449
On the Borel summability of formal solutions of certain higher-order linear ordinary differential equations
Gergő Nemes

http://arxiv.org/abs/2312.14743
Iterated Entropy Derivatives and Binary Entropy Inequalities
Tanay Wakhare

http://arxiv.org/abs/2312.15501
Recent developments pertaining to Ramanujan's formula for odd zeta values
Atul Dixit

http://arxiv.org/abs/2312.15513
Cubic and quintic analogues of Ramanujan's septic theta function identity
Bruce C. Berndt, Örs Rebák

http://arxiv.org/abs/2312.16585
A highly efficient asymptotic preserving IMEX method for the quantum BGK equation
Ruo Li, Yixiao Lu, Yanli Wang

http://arxiv.org/abs/2312.16827
Bilateral Ramanujan series and their $p$-adic mates
Jesús Guillera

http://arxiv.org/abs/2312.17435
Exponential sums over Möbius convolutions with applications to partitions
Debmalya Basak, Nicolas Robles, Alexandru Zaharescu

http://arxiv.org/abs/2312.17469
Rhombic staircase tableaux and Koornwinder polynomials
Sylvie Corteel, Olya Mandelshtam, Lauren Williams

# Other Relevant OP–SF E–Prints

http://arxiv.org/abs/2311.00006
On sums of Fourier coefficients of cusp forms twisted with additive characters
Zihao Liu

http://arxiv.org/abs/2311.00473
On a lifting of $t$-adic symmetric multiple zeta values
Minoru Hirose, Hanamichi Kawamura

http://arxiv.org/abs/2311.00610
Regularized Shannon sampling formulas related to the special affine Fourier transform
Frank Filbir, Manfred Tasche, Anna Veselovska

http://arxiv.org/abs/2311.00707
Green's functions for the isotropic planar relaxed micromorphic model – concentrated force and concentrated couple
Panos Gourgiotis, Gianluca Rizzi, Peter Lewintan, Davide Bernardini, Adam Sky, Angela Madeo, Patrizio Neff

http://arxiv.org/abs/2311.01992
Ghost series and a motivated proof of the Bressoud–Göllnitz–Gordon identities
John Layne, Samuel Marshall, Christopher Sadowski, Emily Shambaugh

http://arxiv.org/abs/2311.02694
Bound state solutions of the two-dimensional Schrödinger equation with Kratzer-type potentials
Roman Ya. Kezerashvili, Jianning Luo, Claudio R. Malvino

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Dongjian Wu

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Pranay Bhardwaj, S. M. Zafaruddin, Amir Leshem

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Series representations for the characteristic function of the multidimensional Markov random flight
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Pasquale Marra, Valerio Proietti, Xiaobing Sheng

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Jorge Arvesú Carballo, Alejandro J. Quintero Roba

Asymptotic coefficients of multiple zeta functions at the origin and generalized Gregory coefficients
Toshiki Matsusaka, Hideki Murahara, Tomokazu Onozuka

Classification of tight $2s$–designs with $s \geq 2$
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Hard edge universality of Muttalib–Borodin ensembles with real parameter $\theta$
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Isothermic tori with one family of planar curvature lines and area constrained hyperbolic elastica
Alexander I. Bobenko, Tim Hoffmann, Andrew O. Sageman–Furnas

Nearest neighbor recurrence relations for Meixner–Angelesco multiple orthogonal polynomials of the second kind
Jorge Arvesú Carballo, Alejandro J. Quintero Roba

The Effect of Vaccination on the Competitive Advantage of Two Strains of an Infectious Disease
Matthew D. Johnston, Bruce Pell, Jared Pemberton, David A. Rubel

Determinantal approach to multiple orthogonal polynomials, and the corresponding integrable equations
Adam Doliwa

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F. L. Freitas

A New Series for Rogers–Ramanujan–Gordon Identities when $k = 3$
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Optimal estimates for mappings admitting general Poisson representations in the unit ball
Deguang Zhong, Fangming Cai, Dongping Wei

A higher–order generalization of an $A_4^{(1)}$–surface type $q$–Painlevé equation with $\widetilde{W}\left((A_{2N} \rtimes A_1)^{(1)} \times A_1^{(1)}\right)$ symmetry
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Bo-Sture K. Skagerstam, Per K. Rekdal

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Harmonic analysis for a multidimensional discrete Laplacian
Óscar Ciaurri

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Iaroslav V. Blagouchine, Eric Moreau

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Artur Kawalec

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Ashish Mor, Surbhi Gupta, Manju Kashyap

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Thermodynamics of the five-vertex model with scalar-product boundary conditions
Ivan N. Burenev, Andrei G. Pronko

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A radial scalar product for Kerr quasinormal modes
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Natural polynomials for Kerr quasi-normal modes
Lionel London, Michelle Gurevich

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Image Processing and Legendre Polynomials
Enrico Celeghini, Manuel Gadella, Mariano A. del Olmo


# Topic #10 ——— OP – SF Net 31.1 ——— January 15, 2024

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 31.2 should be sent by March 1, 2024.

OP-SF NET is the electronic newsletter of the SIAM Activity Group on Special Functions and Or-
thogonal 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 man-
aged 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 (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

*As of the date of the publication of OP-SF NET 31.1, the SIAG/OPSF elections have not occurred.

## Topic #11  ⸺  OP – SF Net 31.1  ⸺  January 15, 2024

From: OP-SF Net Editors
Subject: Thought of the Month by **Iván Area** and **Alejandro Zarzo**


"On his last visit to Vigo, we went to pick him up at the hotel to take him to the airport, which was possibly his last time in Vigo. We were told by reception that he had not yet had breakfast. When André finally came to the reception, he told us that he had placed his alarm clock upside down and had spent all night dreaming that time was moving backwards, and that he could travel back in time to see loved ones he had recently lost. We would like to have now that magical clock and have the possibility to enjoy André's teachings again."

**Iván Area** and **Alejandro Zarzo**, *OPSF-Net 31.1*.