Orthogonal Polynomials and Special Functions

SIAM Activity Group on Orthogonal Polynomials and Special Functions

★ ★ ★ ★ **Newsletter** ★ ★ ★ ★

Published Three Times a Year | June 2001 | Volume 11, Number 3

Contents

From the Editors

This is the second issue of the Newsletter for 2001, the third millennium. A simple glance at it and the previous ones shows the big interest to our area of research, specially when one looks at the increasing number of preprints on OP & SF and related topics. Of special interest is the announcement of the second SIAM summer school on OP & SF to be held this time in Germany. Unfortunately, there is also bad news for our community, the loss of Árpád Elbert, to whom the forthcoming OPSFA Symposium in Rome is dedicated.

As usual a lot of material was collected from OP-SF Net, and we hope that you find this issue useful and interesting and also remind you that you can send items to either of us.

Finally, let us make an announcement. We started our editorial activities in June 1998. In this period a new section dedicated to the preprints in our area has been included in the Newsletter, as well as interesting discussions about possible research directions, and future planning for meetings, conferences, etc. Since our local activities are consuming a lot of time we will end our editorship in the near future. Furthermore, we think that it is important that other members of our community with new ideas will continue this activity, so we kindly ask candidates for this position.

June 1, 2001

Renato Álvarez-Nodarse
(ran@cica.es)

Rafael J. Yáñez
(ryanez@ugr.es)

SIAM Activity Group
on
Orthogonal Polynomials and Special Functions
http://math.nist.gov/opsf

△

△

THE PURPOSE *of the Activity Group is*

—to promote basic research in orthogonal polynomials and special functions; to further the application of this subject in other parts of mathematics, and in science and industry; and to encourage and support the exchange of information, ideas, and techniques between workers in this field, and other mathematicians and scientists.

Message from the Chair

During my term of office as chair, I have been impressed with the enthusiasm of our activity group members. They have supported the elected and appointed officers in all our various programs: minisymposia, summer schools, printed newsletter, electronic newsletter, Web site, and email discussion group. Probably I have left something out of this list, but if so it was an unintended omission. The time is approaching for changes in the activity group leadership, specifically the election and appointment of officers. I ask every activity group member to consider offering service in one of these capacities. There are personal rewards, for example the opportunity to work with and get to know others in your field of research, and to promote the understanding and use of orthogonal polynomials and special functions in all fields of science.

1. Annual Meeting of the Activity Group

I have conducted an annual meeting of the activity group officers each year during my term as chair. This year the meeting will be held at the OPSFA meeting in Rome. I would like to extend an invitation to all members present in Rome to attend the meeting. Since the exact time and place are not yet known, please send me email stating your interest and I will make sure you are informed in advance of the meeting.

2. Election of Officers

The term of office for the elected officers (chair, vice chair, program director, and secretary) is three years. The current term ends in December of this year. According to SIAM procedure, a nominating committee is formed consisting of the current officers plus two members of the activity group appointed by SIAM. This committee is required to give a slate of candidates to SIAM in August. Then SIAM prepares the ballot and mails it to the activity group members.

The nominating committee will meet immediately after the annual meeting at the OPSFA meeting in Rome. Subsequent deliberations of the nominating committee will take place by email. Please send me names of possible nominees, or (better) offer your own name as a nominee.

I have not received the names of the appointed members from SIAM, so if you are interested in being on the nominating committee please send me email. I will inform Tom Manteuffel, the SIAM president, of your interest. Alternatively, you can send email directly to `tmanteuf@colorado.edu` with a copy to me.

3. Appointment of Officers

Currently we have 4 appointed officers in charge of the printed newsletter, electronic newsletter, and Web site. They work together to collect, organize and disseminate information of interest to the activity group in a variety of formats. This sharing of effort reduces the burden that otherwise would fall on a single individual. I am grateful to all them for their diligent service to the activity group.

Three of the appointed officers (the printed newsletter co-editors and the electronic newsletter editor) will end their service this year. Therefore, it is extremely important to start the process of locating replacements. Please consider serving the activity group in one of these capacities and send me email stating your interest.

Daniel Lozier
(`dlozier@nist.gov`)

Obituary for Árpád Elbert 1939-2001

Árpád Elbert died in Budapest on April 25th, 2001 after a recurrence of the illness which had plagued him for nearly a year. We were heartened by his apparent recovery after surgery for a brain tumour last summer but, unfortunately, the recovery was not to last.

Árpád was born in Kaposvár in southwestern Hungary on December 24, 1939 and graduated in Mathematics from the Eötvös Loránd University, Budapest, in 1963, being awarded the Medal for Higher Education. The rest of his career was associated with the Mathematical Institute (founded in 1949 and later named, after its first Director, the Alfréd Rényi Institute) of the Hungarian Academy of Sciences. He received the Academy's degrees of Candidate - equivalent to the North American Ph.D. - (1971) and Doctor of Mathematical Sciences (1989). He had already been awarded the Grűnwald Prize for young mathematicians who have already done remarkable work before graduation from the Academy. His most recent position was that of Scientific Advisor, the highest scientific position in the Institute.

Árpád was the author or co-author of about 100 articles, mostly in the areas of ordinary differential equations and special functions but including also contributions to delay differential equations, Fourier analysis, approximation theory and inequalities. In the great division between theory builders and problems solvers he belonged the latter group and was always ready to help others with their mathematical problems. In 1977, John Lewis and I had made the conjecture that the zeros of the Bessel $J_\nu(x)$ were concave functions of ν for $\nu > 0$. Soon afterwards, Árpád gave an ingenious proof of the concavity on the entire interval of definition of the zeros in question. He did this using only classical tools making especially fruitful use of a formula in G. N. Watson's *Treatise* on the derivative of a zero with respect to ν. The formula was well-known but little used previously. Later, Árpád (mostly with Andrea Laforgia and occasionally with others) was able to make much further use of this and related formulas in the study of inequalities, monotonicity properties and convexity properties of zeros of Bessel and related functions. Whenever I am asked a question in this or a related area my first reaction is to look at the thirty or so articles of Elbert and Laforgia. There is a good summary of some of this work in the paper based on Elbert's plenary talk at OPSFA-Patras which is to appear in *Journal of Computational and Applied Mathematics*. Árpád's death makes a big hole in the program for the forthcoming OPSFA Symposium in Rome. I hope that the time allotted to his lecture can be devoted so some tributes to him and his work.

Árpád was a virtuoso in tough analytic calculations (tools like reversion of series came to him naturally) with an unerring sense of when an inequality was sharp and when an approximation might be replaced by an inequality. In joint work he alternated this role with that of devil's advocate concerning the conjectures of others. This gave a particular added value to a collaboration with him. As Árpád became better known he had many collaborators and invitations to visit institutions and conferences in Italy, Canada, Germany, Greece, the Czech Republic and Japan among other places. A notable collaboration was that with Professor T. Kusano (Fukuoka University) on half-linear and other differential equations.

Árpád will be remembered for his unfailing kindness and courtesy and as a valued and generous collaborator. He is survived by his wife Marika and daughter Judit, now at the beginning of her own mathematical career. A funeral service will be held at Felsőkrisztinavarosi Plébánia Urnatemetője, Budapest XII. ker. Apor Vilmos ter 9, at 16:00 on June 29, 2001.

I am indebted to Gábor Halász for his kindness and promptness in collecting some biographical information and to Lee Lorch for some additional suggestions.

Martin Muldoon
(muldoon@yorku.ca)

Reports from Meetings and Conferences

1. Second Annual Conference on Special Functions and Applications, held at Lucknow, Feb. 2 – 4, 2001.

The second annual conference of the Society for Special Functions and their Applications (SSFA) was held in the historic city of Lucknow, from February 2 to 4, 2001. The delegates and the participants were housed in the Institute of Management and Development of the U.P. Government, which was also the venue of the conference. The inaugural function on Feb. 2 was presided over by Prof. S. Bhargava (Mysore University), a Vice president of the SSFA. Prof. S.K. Joshi – former Director General of the Council of Scientific and Industrial Research, Government of India and Chairman, Research and Assessment Committee, Defence Research and Development Organization, Government of India – was the chief guest. It was a very special occasion for the Society since it felicitated Prof. R.P. Agarwal, the Founder and Patron of SSFA, and a dedicated researcher in the field of special functions, on the occasion of his 76th Birthday. Prof. K. Srinivasa Rao (Institute of mathematical Sciences, Chennai), in his felicitation speech, outlined the outstanding contributions of Prof. Agarwal, the awards and honours conferred on him and emphasised the qualities of his leadership which resulted in the formation of a dedicated group of research workers in the area of special functions and their applications and which lead to the formation of the SSFA. Prof. Joshi and Prof. Bhargava, while felicitating Prof. Agarwal, stressed the importance of special functions in mathematics, physics and other applied disciplines, such as, biological and social sciences. Prof. S. Kanemitsu (Kinki University, Japan), one of the four foreign invitees to the conference, delivered a Keynote address on *Higher Mathematics from an elementary point of view.*

In this three day meeting fifteen invited talks were delivered by experts, – including one by Prof. M. V. Subbarao (Alberta University, Canada, read in absentia by Prof. Bhargava) – on different aspects of special functions and their applications. Besides these, thirty four research contributions were presented by their authors.

The General Body meeting of the Society took place during this period and the conference concluded on Feb. 4 with a Valedictory function at which the following recommendations were adopted:

- To publish a journal of international quality for research papers, duly referreed by experts, in the area of special functions and their applications.
- To encourage the starting of local chapters of the society, State-wise, in places where there are twenty or more members to start with. The aims and objectives of such chapters are to organize periodically lectures by experts and to encourage young research workers in the field of special functions.
- To involve applied mathematicians, Engineers and other users of special functions to project their problems, especially those of interest in the scientific and technological development of the country.
- To further strengthen the relationship of the Society with the Activity Group of Orthogonal Polynomials and Special Functions of SIAM, in order to mutually benefit by their experiences for the cause and furtherance of real life problems facing Physicists, Applied Mathematicians, Engineers and other users of special functions.

– K. Srinivasa Rao and S. Ahmad Ali.
March 2001. (Convenor) (Secretary)

2. International Conference "Analytical Methods of Analysis and Differential Equations" (AMADE-2001), Minsk, Belarus, February 15-19, 2001

The international conference "Analytical Methods of Analysis and Differential Equations" (AMADE-2001) took place February 15-19, 2001 in Minsk, Belarus. It continues the series of the international conferences "Boundary Value Problems, Special Functions and Fractional Calculus" devoted to the 90th birthday of academician F.D.Gakhov (Minsk, Belarus, February 15-20, 1996), and "Analytical Methods of Analysis and Differential Equations" (AMADE) (Minsk, Belarus, September 14-18, 1999). AMADE-2001 was organized by the Belarusian State University, the Belarusian National Academy of Sciences together with Moscow State University. It was held at the Olympic Sport Center "Staiki" which is situated 10 km from Minsk, the capital of Belarus.

262 mathematicians from 21 countries confirmed their interest in the Conference. Abstracts of their reports were published in "Abstracts of AMADE-2001". 138 scientists from Algeria, Belarus, France, Germany, Great Britain, Italy, Kasakhstan, Kuwait, Lithuania, Macedonia, Poland, Russia, Ukraine and Yugoslavia took part in AMADE-2001.

The work of the conference was divided into four sections:

- Integral transforms and special functions.
- Differential equations and applications.

- Integral, difference, functional equations and fractional calculus.

- Real and complex analysis.

There were 20 plenary invited lectures and 124 sectional talks devoted to different problems of analysis and differential equations.

Plenary invited lectures were given by the following mathematicians:

Antonevich A.B. (Minsk, Belarus) Homogeneous Banach algebras and algebraic fibering.

Begehr H. (Berlin, Germany) Orthogonal decompositions in L_2.

Burenkov V.I. (Cardiff, UK) Equivalence of embedding theorems for Sobolev spaces to some spectral properties of Neumann Laplacian.

Volovich I.V. (Moscow, Russia), Radyno Ja.V. (Minsk, Belarus), Khrennikov À.Ju. (Vaxjo, Sweden) Operator of multiplication on the group of adels.

Vu Kim Tuan (Kuwait) The Paley-Wiener theorem for Sturm-Liouville transform.

Glaeske H.-J. (Jena, Germany) On a Hermite transform in spaces of generalized functions on R^n.

Gromak V.I. (Minsk, Belarus) Discrete Painleve equations of the high order.

Dzhenaliev M.T., Ramazanov M.I. (Almaty, Kazakhstan) On loaded equations with periodic boundary conditions.

Galkowski K. (Z.Gora, Poland), Owens D.H. (Sheffield,UK) Control problems for a class of 2d repetitive systems.

Kakichev V.A. (Novgorod, Russia) Convolution of the Borel transform,

Karapetyants N.K. (Rostov-on-Don, Russia) On a statement of the problem for equations with fractional-linear shift on the axes.

Kilbas A.A. (Minsk, Belarus) Some aspects of the theory of differential and integral equations of fractional order.

Lanza de Cristoforis M., Lamberti P.D. (Padova, Italy) An analyticity theorem for symmetric functions of the eigenvalues of a compact self-adjoint operator.

Laurinchikas À. (Vilnius, Lituania) The universality of certain zeta function.

Marti J.-A. (Guadeloupe, France) On some characteristics of Cauchy problems.

Minyuk S.A. (Grodno, Belarus), Metelskii À.V. (Minsk, Belarus) On completeness of linear systems with a delay.

Mityushev V.V. (Slupsk, Poland) Problem of R-linear conjugation and its applications in mechanics of composite materials.

Rogosin S.V. (Minsk, Belarus) On complex variable approach for moving boundary value problems.

Yurchuk N.I., Baranovskaya S.N., Yashkin V.I. (Minsk, Belarus) On the classic and the weakened solutions of hyperbolic equations of even order.

February 19th, 2001 was a day in memory of academician F.D.Gakhov (1906-1980), the founder of Belarusian school on boundary value problems and singular integral equations. His former students and successors gave talks.

Participants remarked on the high scientific level of the conference.

The Proceedings of AMADE-2001 will be published in special issues of the Journal "Proceedings of Institute of Mathematics" of the Belarusian National Academy of Sciences. Some of the reports were recommended for publication in the Journal "Integral Transforms and Special Functions".

Anatoly Kilbas
(kilbas@mmf.bsu.unibel.by)

Sergei Rogosin
(rogosin@mmf.bsu.unibel.by)

Forthcoming Meetings and Conferences

1. Hong Kong Summer School in Applied Analysis. City University of Hong Kong. July 2-13, 2001.

Dates: July 2nd- July 13, 2001

Place: City University of Hong Kong

Organizing Committee: Joaquin Bustoz, Mourad Ismail, Rupert Lasser, Jurgen Prestin, Rod Wong.

Lecturers (Confirmed): A. Grunbaum (Berkeley) M. E. H. Ismail (U South Florida and City U), A. Its (IUPUI and U Penn), R. Lasser (Munich), B. Simon (Caltech), W. Van Assche (Leuven), and Rod Wong (City U).

In addition to the above structured courses we intend to have several one hour talks on more advanced topics. This will be done in the later part of the program.

Conference Secretary: Colette Lam.

Contact Information: malam@cityu.edu.hk

For further information see the URL:

http://www.cityu.edu.hk/ma/liube/sschool/

Rafael J. Yáñez
(ryanez@ugr.es)

2. The Fourth International Conference "Symmetry in Nonlinear Mathematical Physics", Institute of Mathematics, National Academy of Sciences of Ukraine and Ukrainian Pedagogical University. July 9–15, 2001, Kyiv (Kiev), Ukraine.

Topics: Classical, Nonclassical, Conditional and Approximate Symmetry of Equations of Mathematical Physics; Symmetry in Nonlinear Quantum Mechanics, Quantum Fields, Gravity, Fluid Mechanics, Mathematical Biology, Mathematical Economics; Representation Theory; q-Algebras and Quantum Groups; Symbolic Computations in Symmetry Analysis; Dynamical Systems, Solitons and Integrability; Supersymmetry and Parasupersymmetry.

Organizing Committee: A. Nikitin (Co-Chairman, Ukraine); A. Samoilenko (Co-Chairman, Ukraine); J. Beckers (Belgium); G. Bluman (Canada); P. Clarkson (UK); N.Debergh (Belgium); H.-D. Doebner (Germany); G. Goldin (USA); B.K. Harrison (USA); N. Ibragimov (Sweden); M. Lakshmanan (India); J. Niederle (Czech Republic); M. Tajiri (Japan); P. Winternitz (Canada); A. Klimyk, M. Shkil, I. Skrypnyk, I. Yehorchenko, R. Zhdanov (Ukraine)

Further information is available on the web site

http://www.imath.kiev.ua/~appmath/conf.html

Conference Address: Anatoly Nikitin
Institute of Mathematics, National Academy of Sciences of Ukraine. 3 Tereshchenkivska Street, Kyiv 4, Ukraine
E-mail: appmath@imath.kiev.ua
Fax: +38 044 235 20 10
Phone: +38 044 224 63 22, +38 044 250 08 96

Renato Álvarez-Nodarse
(ran@cica.es)

3. European Summer School in Mathematics: Asymptotic combinatorics with applications to mathematical physics, July 9-22, 2001, Saint-Petersburg, Russia.

Short description: The summer school aims to observe the recent progress in the asymptotic theory of Young tableaux and random matrices from the point of view of combinatorics, representation theory and theory of integrable systems. Systematic courses on the subjects and current investigations will be presented.

The main goals:

1. To make known the recent progress in asymptotic representation theory and related asymptotic combinatorics and its applications to mathematical and statistical physics.
2. To make appropriate courses on these topics for graduate students and mathematicians who have no knowledge on the problems.
3. To organize simultaneous seminars and the conference on the topic.
4. To publish the proceedings of the Summer School.
5. To intensify contacts between specialists and first of all between young mathematicians from Russia and from the West.

Scientific Committee: O.Bohigas (Paris, Univ. Paris-Sud), E. Bresin (Paris, ENS), P. Deift (US, Philadelphia), L. Faddeev (St.Petersburg), K. Johansson (Stockholm KTH), M. Kontsevich (IHES, Bures-sur-Yvette), V. Malyshev (INRIA, France), R. Stanley (US, MIT), A. Vershik (St.Petersburg, Chairman)

Organizing Committee: V. Kazakov (Paris, ENS), A. Lodkin (St.Petersburg), Yu. Neretin (Moscow, Independent Univ.), A. Okounkov (US, Berkeley), L. Pastur (Paris, Univ. Paris-7).

Contact email: emschool@pdmi.ras.ru

For further information see the URL:

http://www.pdmi.ras.ru/EIMI/2001/emschool/

Tom H. Koornwinder
(thk@science.uva.nl)

4. 6th International Conference on Difference Equations and Applications. July 30 – August 3, 2001, Augsburg, Germany.

Dear Colleague,

this is the final call for papers for the 6th International Conference on Difference Equations and Applications (ICDEA2001) to he held in Augsburg, Germany from July 30 to August 3,2001. Please note that the deadline for the reduced registration fee expires at the end of May.

For more information please see the conference web-page

http://www.math.uni-augsburg.de/icdea2001

from where you can get the registration form. In case you want to register and you have trouble with the downloads, please respond to icdea2001@math.uni-augsburg.de or to icdea2001@gmx.de and we send you the forms and other conference material per post. In this case the **deadline for the reduced registration fee is extended** until June 30.

Bernd Aulbach
(aulbach@math.uni-augsburg.de)

5. Second Announcement: 2001: A Mathematics Odyssey. A conference on the analytic theory of continued fractions, orthogonal functions, rational approximation and related topics. Grand Junction (Colorado, USA), August 6-10, 2001.

A Celebration of the 70th birthday of William B. Jones, Professor Emeritus, University of Colorado, Boulder, USA Location: Mesa State College Grand Junction, Colorado, USA August 6-10, 2001.

Sponsored by the School of Natural Sciences and Mathematics and the Office of Academic Affairs at Mesa State College.

Organizers:
Cathy Bonan-Hamada, Phil Gustafson
Department of Computer Science,
Mathematics and Statistics,
Mesa State College, 1100 North Ave.
Grand Junction, CO, 81501-3122 USA
E-mails: cbonan@mesastate.edu and
pgustafs@mesastate.edu
Phone (office): 970-248-1838 and 970-248-1176

In recognition of the contributions Professor William B. Jones has made to the field of continued fractions and rational approximation, the conference 2001: A Mathematics Odyssey is organized in his honor. The conference will be held August 6-10, 2001, at Mesa State College in Grand Junction, Colorado, USA.

More information about Mesa State College can be found at www.mesastate.edu

The Grand Junction area is the largest urban center in Western Colorado, with a regional population of approximately 100,000. In August you can expect low humidity, plenty of sunshine, warm days (about 95° Fahrenheit, 35° Celsius) and temperate nights (about 65° Fahrenheit, 18° Celsius).

Accommodations

The organizers have reserved a block of rooms at Hawthorn Suites Ltd. located at 225 Main Street. Conference participants will receive a rate of $79 per night for a studio suite with one queen size bed or a rate of $89 per night for a double studio suite with two queen size beds. A complimentary hot breakfast buffet is included. All studio suites have a dataport, refrigerator, and microwave. The hotel also has a small indoor heated pool and spa and a fitness center. If you choose to stay at Hawthorn Suites, please fill out the reservation form available from the organizers and fax it to the hotel directly. The fax number is on the form. Hawthorn Suites will hold the block of rooms for the conference until July 2.

A block of rooms has also been reserved in Monument Hall on the Mesa State College campus. The rooms are suite-style with two rooms sharing a bathroom. Each room has two beds, two desks, and two desk chairs. A single room will cost $30 per night. A shared room will cost $19 per person per night. To make reservations for Monument Hall, please fill out the housing form (available from the organizers) and mail with payment along with your registration to the conference organizers by June 1.

There will be a program of social events and excursions.

Scientific Program

All participants are invited to give a talk. It is anticipated that most talks will be between 30 minutes and 1 hour. If you would like to give a talk, please indicate the length and title of your talk on the registration form. It is possible that there will be time available for participants to give more than one talk. If you would like to give more than one talk, please prioritize your talks on the registration form. The organizers should receive an abstract for each talk no later than July 15, 2001.

The room in which the majority of the talks will be given includes board space, an overhead projector, a slide projector, video and computer projection systems, audio systems, internet access, and PowerPoint 97. If you need additional information about the presentation capabilities of the room, please contact the organizers.

Proceedings

The Rocky Mountain Journal of Mathematics has agreed to publish the proceedings of the conference. Please indicate on the registration form whether you might want to contribute to the proceedings. Papers will be subject to the standard editorial processes of RMJM. The deadline for submitting papers to the proceedings will be September 30, 2001.

Registration

A registration form is available from the organizers. All quoted fees are in U.S. dollars. The organizers have decided to allow participants to customize their fee by choosing (or not) to have lunch provided on campus, to attend the conference dinner, and/or to attend the half day excursion. The basic registration fee of $75 includes basic

conference costs, coffee breaks, and a copy of the proceedings. We have arranged for a daily catered buffet lunch to be provided on campus. Total cost for five days is $50 per person. For those who choose not to eat on campus, there are several fast food establishments within walking distance. The cost for participants and accompanying person(s) for the conference dinner will be $35 per person. The cost for participants and accompanying person(s) for the half day excursion will be $30 per person.

Payment for conference fees can be make by enclosing a check from a U.S. bank made out to Mesa State College or by credit card by filling in the appropriate information on the registration form.

Deadline for registration and payment is June 1, 2001.

Money Exchange

It is extremely difficult (read impossible) to exchange money in Grand Junction. Please exchange sufficient money before arriving. Major credit cards are accepted at most establishments and ATM machines are available at several locations.

More information about Mesa State College and Grand Junction, Colorado, can be found at `http://www.mesastate.edu`

Cathy Bonan-Hamada
(`cbonan@mesastate.edu`)
Phil Gustafson
(`pgustafs@mesastate.edu`)

6. Third International Dortmund Meeting in Approximation Theory. Haus Bommerholz - Witten, Germany. August 20 - 24, 2001

Organizers:

• Martin D. Buhmann, University of Giessen
(`martin.buhmann@math.uni-giessen.de`),

• Detlef H. Mache, University of Dortmund,
(`mache@math.uni-dortmund.de`),

• Manfred W. Müller, University of Dortmund
(`mueller@math.uni-dortmund.de`).

The main aim of this conference IDoMAT 2001 is to bring together invited researchers, to discuss problems and to promote the transfer of results, ideas and applicable methods in the following fields in the Theory of Constructive Approximation:

- Approximation Methods
- Approximation by Operators
- Interpolation
- Radial Basis Functions
- Orthogonal Polynomials
- (Multi-) Wavelets
- Neuronal Networks
- CAGD

Proceedings of IDoMAT 2001 and accepted research papers: We intend to publish the invited lectures and the accepted research papers in the Proceedings (Volume 3): New Topics in Constructive Approximation.

This third Volume (after Volume 1: Approximation Theory - IDoMAT 95 (Akademie Verlag Berlin) and Volume 2: New Developments in Approximation Theory - IDoMAT 98 (Birkhäuser Verlag Basel)) will be published in the International Series of Numerical Mathematics by Birkhäuser Verlag Basel.

IDoMAT 2001 - Office:

University of Dortmund
Institute of Applied Mathematics (Approximation Theory, LS VIII)
D - 44221 Dortmund (Germany)

E-mail: `idomat@math.uni-dortmund.de`

Rafael J. Yáñez
(`ryanez@ugr.es`)

7. Session "Computer Algebra and Computer Analysis" of the 3rd International ISAAC Congress, Berlin, Germany, 20-25 August 2001

• Dear colleagues,

This is to advertise the session "Computer Algebra and Computer Analysis" of the 3rd International ISAAC Congress (ISAAC=International Society for Analysis, Applications and Computing; this is **not** the ISSAC!) which will take place in Berlin from 20-25 August 2001, see

`http://www.math.udel.edu/~gilbert/isaac/isaac01`

The meeting offers sessions in a wide variety of topics primarily circling around applied analysis. Session VII.4 is devoted to "Computer Algebra and Computer Analysis", and will be organized by Karin Gatermann, Berlin (`gatermann@zib.de`) and Wolfram Koepf, Kassel (`koepf@mathematik.uni-kassel.de`).

Researchers in analysis often are not familiar with computer algebra or find its use unsuitable for their work. In contrast, we believe that computer algebra can be a very stimulating research tool in analysis. Therefore we would like to put a session program together which is an advertisement for our field, and which presents applications of computer algebra to topics relevant for analysis.

The following speakers have already confirmed to present keynote lectures in our session:

- Liz Mansfield (Canterbury, Great Britain) title to be announced
- Jan Sanders (Amsterdam, The Netherlands) The classification of integrable evolution equations using number theory
- Werner Seiler (Mannheim, Germany) Completion to involution and the numerical integration of general systems of PDEs

Please contact one of us as soon as possible if you are interested in participating and/or presenting a lecture in our session. The duration of the lectures will be probably 30 minutes (including discussion), but final decisions will be made later. We would be very happy about your positive answer. If possible, let us have a preliminary title of your lecture.

Karin Gaterman
(gatermann@zib.de)
Wolfram Koepf
(koepf@mathematik.uni-kassel.de)

8. Summer School on Orthogonal Polynomials, Harmonic Analysis, Approximation and Applications. September 17 - 21, 2001 at Inzell, Germany

The SIAM Activity Group (SIAG) on Orthogonal Polynomials and Special Functions organizes a series of summer schools. The first of this series was the school in Laredo, Spain, in 2000. This year we kindly invite you to Inzell, Germany, in the Alps southeast of Munich. It is planned to continue the series in 2002 in Leuven, Belgium (contact Erik Koelink), and 2003 in Coimbra, Portugal (contact Amilcar Branquinho).

The goal of the Summer School is to give four introductory courses in advanced research topics on orthogonal polynomials, harmonic analysis, approximation and applications. Some free discussions and some informal seminars will also be available. The expected audience are graduate and recent postgraduate students as well as young active researchers.

The topics to be considered will be:

- Orthogonal Polynomials
- Banach Algebras
- Statistics
- Nonharmonic Fourier Series
- Applications.

There will be four plenary mini-courses. The titles can be found below. Also there will be special sessions where the participants will have the opportunity to give some short research seminars as well as a panel discussion. Because of the reduced numbers of these seminars we kindly ask to such participants who want to present their own results to send us as soon as possible the abstract. Priority will be given to those talks close related to the main subjects of the school.

Lecturers:

- H. Dette (Bochum, Germany): Canonical moments, orthogonal polynomials with applications to statistics
- K. Seip (Trondheim, Norway): On nonharmonic Fourier series: Riesz bases and frames of complex exponentials
- R. Swarcz (Wroclaw, Poland): Orthogonal polynomials with applications to Banach algebras
- Y. Xu (Eugene, Oregon, USA): Orthogonal polynomials of several variables

The local organizing committee for this summer school consists of:

- Rupert Lasser , Institute of Biomathematics and Biometrics , GSF - National Research Center for Environment and Health, Neuherberg, Germany, and Technische Universität München, Germany
- Brigitte Forster, Graduate Program "Applied Algorithmic Mathematics", Technische Universität München, Munich, Germany
- Frank Filbir, Mathematical Institute, Medizinische Universität zu Lübeck, Germany

The scientific committee, acting for the whole series of summer schools 2001-2003 consists of:

- Amilcar Branquinho, Universidade de Coimbra, Portugal
- Erik Koelink, Technische Universiteit Delft, the Netherlands
- Rupert Lasser, GSF-Forschungszentrum für Umwelt und Gesundheit and Technische Universität München, Germany
- Francisco Marcellán, Universidad Carlos III de Madrid, Spain,
- Walter Van Assche, Katholieke Universiteit Leuven, Belgium.

For further information see the URL
http://www.gsf.de/ibb/ag1/summerschool/

Walter Van Assche
(walter@wis.kuleuven.ac.be)

9. International Conference on "NUMERICAL ALGORITHMS" dedicated to Claude Brezinski on the occasion of his 60th birthday. Marrakesh (Morocco), October 1-5, 2001

We intend to organize an international conference in October 2001 to celebrate the 60th birthday of Claude Brezinski and, at the same time, the 10th anniversary of the journal Numerical Algorithms that he founded in 1991 and where contributed papers will be published. The themes of the conference will cover all aspects of Numerical Analysis, in particular those which are related to numerical algorithms. The goal of this conference is to bring together experts from these areas. The numerical analysis community is warmly invited to attend so that we have a valuable scientific meeting and celebrate Claude's 60th birthday at the banquet.

A web site containing all the information about this conference can be found at

http://www-lma.univ-littoral.fr/~na2001

If you are interested in participating, please notify us as soon as possible at the address

na2001@lma.univ-littoral.fr

In this way, you will regularly receive new updated information about this event.

Organizing committee:

- B. Beckermann (University of Lille I, France)
- A. Bentbib (Faculty of Sciences and Technologies, Marrakesh, Morocco)
- B. Germain-Bonne (University of Lille I, France)
- J.-P. Chehab (University of Lille I, France)
- M. El Alaoui-Talibi (Faculty of Sciences Semlalia, Marrakesh, Morocco)
- A. Fdil (ENS, Marrakesh, Morocco)
- A. Lembarki (Faculty of Sciences Semlalia, Marrakesh, Morocco)
- M. Prevost (University of Littoral, Calais, France)
- A. Matos (University of Lille I, France)
- A. Messaoudi (ENS, Rabat, Morocco)
- M. Redivo-Zaglia (University of Calabria, Cosenza, Italy)
- R. Sadaka (ENS, Rabat, Morocco)
- H. Sadok (University of Littoral, Calais, France)
- J. Van Iseghem (University of Lille I, France)

Planes and Airports: The main international airport in Morocco is the AEROPORT DE CASABLANCA MOHAMMED V. Casablanca has direct connections to major European cities (e.g., Amsterdam, Barcelona, Bordeaux, Brussels, Frankfurt, Genf, Lisboa, London, Lyon, Madrid, Marseille, Moscow, Nice, Paris, Roma, Strasbourg, Toulouse) and elsewhere (e.g., Johannesburg, Montreal, New York). Airlines serving Casablanca (e.g.): Royal Air Maroc (AT), Air France (AF), Alitalia (AZ), British Airways (BA), Swissair (SR), Lufthansa (LH), Iberia (IB), Sabena (SN), Aeroflot (SU).

Marrakech can be reached by plane from Casablanca (one hour). There are also direct flights to Marrakech (including charters) from several major European cities.

If you arrive in Casablanca and you would like to discover Morocco: there is a train connection from Casablanca to Marrakech.

Visa: For a stay up to three months, citizens from the following countries do not require a visa but a return ticket and a passport being valid for at least 6 months from date of entry (NB: children of 15 and under may travel on their parents' passport, but must have photographs included in these passports by the relevant passport authorities): European Union, Andorra, Argentina, Australia, Bahrain, Brazil, Canada, Chile, Congo (Rep. of), Côte d'Ivoire, Guinea, Iceland, Indonesia, Japan, Korea (Rep. of), Kuwait, Libya, Liechtenstein, Mali, Malta, Mexico, Monaco, New Zealand, Niger, Norway, Oman, Peru, Philippines, Puerto Rico, Qatar, Romania, Saudi Arabia, Senegal, Switzerland, Tunisia, Turkey, United Arab Emirates, USA, and Venezuela

For citizens from other countries and further details please contact the Moroccan embassy.

Accomodation: Participants will be accomodated in a 4 stars hotel comparable to the best European or American hotels. In Marrakesh, the weather is very nice in October and the town can be easily reached by plane from Casablanca (one hour). Casablanca has direct connections to major European cities and to New York and Montreal.

A special reduced price will be negotiated for the participants. We hope that the prices will be about 230 MAD (30USD) for one person in a double room and 320MAD (40USD) in a single room.

Special requirements should be communicated to the Organizing Committee by e-mail at

na2001@lmpa.univ-littoral.fr.

If you want to look at the kind of hotels in Marrakesch, see http://hotelinfoplus.com or Marrakesh Hotels (http://www.m-link.com/almusaafer/MOROCCO/HOTELS/hotmarak.html).

Weather: In October, the weather in Marrakech is very nice and not too hot (about 27 degrees Celsius).

Money: Approximate exchange rate (June 2000): 100 Moroccan Dirham = 10.3 Euro = 417 Belgian Franc = 67.8 French Franc = 20.2 German Mark = 9.3123 US Dollar

Rafael J. Yáñez
(ryanez@ugr.es)

10. Second International Workshop On Contemporary Problems In Mathematical Physics. Institut De Mathematiques Et De Sciences Physiques (Imsp), Porto-Novo (BENIN). October 28th - November 2nd, 2001

The main objective of the workshop is to contribute to the development of a critical mass of researchers in Africa in such a dynamic area as mathematical physics. The workshop brings together specialists from diverse topics in Theoretical and Mathematical Physics. It offers to the international scientific community the possibility of exchanging useful information on contemporary problems in these fields through direct interaction. The workshop also provides young African researchers with an opportunity to know each other and to initiate scientific cooperation. Therefore the workshop helps to strengthen research capacity and revitalize activities in mathematical physics in African universities.

The workshop is organized every second year in the Republic of Benin under the supervision of an Executive Secretariat composed as follows:

Director: Professor M. N. Hounkonnou, Institut de Mathématiques et de Sciences Physiques (IMSP), Unité de Recherche en Physique Théorique, B.P. 2628 Porto-Novo, Republic of Benin.

Coordinator for Scientific Activities: Professor J.P. Antoine, Institut de Physique Théorique, Université catholique de Louvain, 2, Chemin du Cyclotron, B-1348 Louvain-la-Neuve, Belgium.

Coordinator for International Relations: Professor H. Capo, Université Nationale du Bénin, B.P. 525 Cotonou, Benin.

US Coordinator of the Workshop: Professor A. Msezane, Center for Theoretical Studies of Physical Systems, Clark Atlanta University, Atlanta, Georgia 30314, USA.

The first International workshop on this series - COPROMAPH1- has been organized in Benin from October 31st to November 5th, 1999. The second workshop - COPROMAPH2- will include invited review talks and contributed communications. The invited review talks will be presented in plenary sessions whereas the contributed papers will be presented in working groups.

Topics for COPROMAPH2 include

- Coherent States, Wavelets and Geometric Methods in Theoretical Physics
- Modern Physics: Field Theory, Atomic, Molecular, Statistical Physics and Theoretical Chemistry
- Functional Analysis and Algebraic Methods for Theoretical Physics, Special Functions and Orthogonal Polynomials.

The book of abstracts will be distributed to the participants upon registration at the workshop desk. The proceedings of the workshop will be published by World Scientific Publishing Co. The proceedings of the First International Workshop on Contemporary Problems in Mathematical Physics (COPROMAPH1) are available from the same publishing house

Official languages: English and French.

Scientific Advisory Committee: A. Afouda (Benin), S. T. Ali (Canada), J.P. Antoine (Belgium), A. Banyaga (USA), A. Bellemans (Belgium), S. Belmehdi (France), K. Bota (USA), X. Chapuisat (France), J. M. Combes (France), G. Ciccotti (Italy), C. S. Diatta (Senegal), J. P. Ezin (Benin), J. P. Gazeau (France), C. Goudjo (Benin), J. Govaerts (Belgium), M. N. Hounkonnou (Benin), R. Kerner (France), J. Klauder (USA), W. Koepf (Germany), W. A. Lester (USA), A. Makhoute (Maroc), M. Mareschal (CECAM), M. Mbonye (USA), A. Msezane (USA), S. Mtingwa (USA), R. Murenzi (USA), J. Pestieau (Belgium), A. Ronveaux (Belgium), J. P. Ryckaert (Belgium), B. Torrésani (France), J. Weyers (Belgium). Organizing Committee: E. Azatassou (Benin), E. Baloïtcha (Benin), J. O. Chabi (Benin), H. Capo (Benin), X. Chapuisat (France), J. M. Combes (France), C. Duqué (Belgium), N. Fonton (Benin), J. Govaerts (Belgium), M. N. Hounkonnou (Benin), A. Msezane (USA), B. Olory (Benin).

Registration and abstracts have to be received before July 15th. The invited speakers are also requested to send a one page abstract of their presentation.

This second International workshop (COPROMAPH2) will be co-organized by

Prof. J. Govaerts
Institut de Physique Nucléaire
Université Catholique de Louvain 2, Chemin du Cyclotron
B-1348 Louvain-la-Neuve, Belgium
E-mail: govaerts@fynu.ucl.ac.be

and

Prof. M N Hounkonnou
Institut de Mathématiques et de Sciences Physiques (IMSP)
B.P. 2628
Porto-Novo, Benin
E-mail: hounkon@syfed.bj.refer.org

The activity is open to scientists from all countries. Travel and subsistence expenses of the participants should be covered by the home institution. However, limited funds will be made available for scientists from African countries. For more informations about: registration fees, presentation of communications, lodging facilities and the city of Cotonou please consult the web page http://www.chez.com/imspurpt/copromaph2

André Ronveaux
(Andre.Ronveaux@fundp.ac.be)

11. Workshop on Special Functions at FoCM'02 IMA, Minneapolis, MN, USA, 5-14 August 2002

A workshop on Special Functions will be organized by Tom Koornwinder and Adri Olde Daalhuis at the conference FoCM'02 at the IMA, Minneapolis, MN, USA, 5-14 August 2002. This workshop, one of nineteen workshops during this conference, will run for 3 successive afternoons during 5-7 August 2002 (Monday - Wednesday). This will be immediately after the IMA 2002 Summer Program "Special Functions in the Digital Age" at the IMA in Minneapolis, 22 July–2 August 2002.

Talks in the workshop are by invitation, but feel free to contact the workshop organizers if you wish to present a talk.

Further information will appear on webpage

http://www.science.uva.nl/~thk/FoCM02/

Tom Koornwinder
(thk@science.uva.nl)
Adri Olde Daalhuis
(adri@maths.ed.ac.uk)

Future Planning

If you are planning to organize a workshop, summer school, conference, special session, etc., we suggest that you inform one of the officers of the SIAM activity group and we will keep the activity group informed by publishing the intended date in the newsletter, so as to avoid the coincidence of several meetings. Please contact the local organizers in case of conflict or for finding a solution for possible overlap. The SIAM activity group will not be involved in the actual organization.

- As already mentioned in OP-SF NET 6.5, the next meeting in the series Fields-Toronto (1995) - CRM-Montreal (1996) - Mount Holyoke (1998) - Hong Kong (1999) - Arizona (2000) is expected to be held in Amsterdam, in summer 2003, to be organized by Tom Koornwinder (thk@wins.uva.nl), Nico Temme (nico@cwi.nl) and Erik Koelink (koelink@twi.tudelft.nl).

- There are plans to organize summer schools on "Orthogonal Polynomials and Special Functions" in Europe during the coming three years:

  - 2001, September 17-23: in Germany (Inzell). The theme is "Orthogonal polynomials, approximation, harmonic analysis, and applications". Contact person: Rupert Lasser (lasser@gsf.de)
  - 2002, June 15-20: in Belgium (Katholieke Universiteit Leuven). The theme is "OP&SF: Asymptotics and applications in combinatorics, computer amgebra and physics". Contact person: Walter Van Assche (walter@wis.kuleuven.ac.be) or Erik Koelink (koelink@twi.tudelft.nl)
  - 2003, July 14-26: in Portugal (Universidade de Coimbra). The theme is "OP&SF: approximations and iterations". Contact person is Amilcar Branquinho (ajplb@mat.uc.pt) or Francisco Marcellán (pacomarc@ing.uc3m.es)

  Coordinator of the three summer schools is Erik Koelink (koelink@twi.tudelft.nl). These summer schools are part of the Activity Group's scientific program and will be organized only if sufficient finacing from the European Union (Euroconference) is obtained. The scientific committee consists of Erik Koelink, Rupert Lasser, Amilcar Branquinho, Paco Marcellán and Walter Van Assche.

- There is a plan for an IMA 2002 Summer Program "Special Functions in the Digital Age" to be held in Minneapolis, USA, July 22 - August 2, 2002. A session on special functions of considerable size is planned during this meeting.

Walter Van Assche
(walter@wis.kuleuven.ac.be)

Books and Journals

Book Announcements

1. Orthogonal Polynomials of Several Variables, Charles Dunkl and Yuan Xu. Cambridge University Press. 400 Pages, Hardback, ISBN: 0-521-80043-9

This information is taken from the web site: `http://www.cambridge.org`

This is the first modern book on orthogonal polynomials of several variables, which are valuable tools used in multivariate analysis, including approximations and numerical integration. The book presents the theory in elegant form and with modern concepts and notation. It introduces the general theory and emphasizes the classical types of orthogonal polynomials whose weight functions are supported on standard domains such as the cube, the simplex, the sphere and the ball. It also focuses on those of Gaussian type, for which fairly explicit formulae exist. The authors' approach blends classical analysis and symmetry-group-theoretic methods. The book will be welcomed by research mathematicians and applied scientists, including applied mathematicians, physicists, chemists and engineers.

Contents:

1. Background
2. Examples of orthogonal polynomials
3. General properties of orthogonal polynomials
4. Root systems and Coxeter groups
5. Spherical harmonics associated with reflection groups
6. Classical and generalized classical orthogonal polynomials
7. Summability of orthogonal polynomials
8. Orthogonal polynomials associated with symmetric groups
9. Orthogonal polynomials associated with octahedral groups

Rafael J. Yáñez
(ryanez@ugr.es)

2. Orthogonal Polynomials for Exponential Weights, A.L. Levin & D. Lubinsky, 490 pp. Hardcover. ISBN: 0-387-98941-2

This information is taken from the web site: `http://www.springer.de`

The analysis of orthogonal polynomials associated with general weights was a major theme in classical analysis in the twentieth century, and undoubtedly will continue to grow in importance in the future. In this monograph, the authors investigate orthogonal polynomials for exponential weights defined on a finite or infinite interval. The interval should contain 0, but need not be symmetric about 0; likewise the weight need not be even. The authors establish bounds and asymptotics for orthonormal and extremal polynomials, and their associated Christoffel functions. They deduce bounds on zeros of extremal and orthogonal polynomials, and also establish Markov- Bernstein and Nikolskii inequalities. The authors have collaborated actively since 1982 on various topics, and have published many joint papers, as well as a Memoir of the American Mathematical Society. The latter deals with a special case of the weights treated in this book. In many ways, this book is the culmination of 18 years of joint work on orthogonal polynomials, drawing inspiration from the works of many researchers in the very active field of orthogonal polynomials.

Contents:

1. Introduction and Results.
2. Weighted Potential Theory: The Basics.
3. Basic Estimates for Q, at.
4. Restricted Range Inequalities.
5. Estimates for Measure and Potential.
6. Smoothness of $\rho(t)$.
7. Weighted Polynomial Approximation.
8. Asymptotics of Extremal Errors.
9. Christoffel Functions.
10. Markov-Bernstein and Nikolskii Inequalities.
11. Zeros of Orthogonal Polynomials.
12. Bounds on Orthogonal Polynomials.
13. Further Bounds and Applications.
14. Asymptotics of Extremal Polynomials.
15. Asymptotics of Orthonormal Polynomials.

Rafael J. Yáñez
(ryanez@ugr.es)

3. Stochastic Processes and Orthogonal Polynomials Series: Lecture Notes in Statistics, Vol. 146 Wim Schoutens, Katholieke Universiteit Leuven, B-3001 Heverlee 184 pages , 6 1/8 x 9 1/4, paperback ISBN: 0-387-95015-X

This information is taken from the web site: `http://www.springer-ny.com`

The book offers an accessible reference for researchers in the probability, statistics and special functions communities. It gives a variety of interdisciplinary relations between the two main ingredients of stochastic processes and orthogonal polynomials. It covers topics like time dependent and asymptotic analysis for birth-death processes and diffusions, martingale relations for Lévy processes, stochastic integrals and Stein's approximation method. Almost all well-known orthogonal polynomials, which are brought together in the so-called Askey Scheme, come into play. This volume clearly illustrates the powerful mathematical role of orthogonal polynomials in the analysis of stochastic processes and is made accessible for all mathematicians with a basic background in probability theory and mathematical analysis.

Wim Schoutens is a Postdoctoral Researcher of the Fund for Scientific Research-Flanders (Belgium). He received his PhD in Science from the Katholieke Universiteit Leuven, Belgium.

Contents:

1. The Askey-Scheme of Orthogonal Polynomials.
2. Stochastic Processes.
3. Birth and Death Processes and Orthogonal Polynomials,
4. Random Walks and Orthogonal Polynomials.
5. Sheffer Systems.
6. Orthogonal Polynomials in Stochastic Integration Theory.
7. Chaotic and Previsible Representations for Lévy Processes.
8. Stein Approximation and Orthogonal Polynomials.

Rafael J. Yáñez
(`ryanez@ugr.es`)

OP-SF preprints

In this section we will include information on some recent preprints related to Orthogonal Polynomials and Special Functions that were recently posted or cross-listed to one of the subcategories of the xxx archives. See:

- `http://front.math.ucdavis.edu/math.CA`
- `http://front.math.ucdavis.edu/math.CO`
- `http://front.math.ucdavis.edu/math.QA`
- `http://xxx.lanl.gov/archive/solv-int`

1. math.CA/0101011

   Title: Some divergent trigonometric integrals

   Authors: Erik Talvila

   Comments: to appear in a slightly different version in Amer. Math. Monthly

   Subj-class: Classical Analysis

   MSC-class: 26A42

   Abstract: Some divergent trigonometric integrals have appeared in standard tables for many years, listed as converging. We give a simple proof that these integrals diverge and trace their history. The original error was made when a (startlingly) famous mathematician incorrectly differentiated under the integral sign with some convergent integrals that depend on a paramater.

2. math.CA/0101012

   Title: Necessary and sufficient conditions for differentiating under the integral sign

   Authors: Erik Talvila

   Subj-class: Classical Analysis

   MSC-class: 26A39

   Abstract: We give necessary and sufficient conditions for differentiating under the integral sign an integral that depends on a parameter. The conditions require the equality of two iterated integrals and depend on being able to integrate every derivative. The Henstock integral is thus used in an essential way.

3. math.CA/0101013

   Title: Rapidly growing Fourier integrals

   Authors: Erik Talvila

   Subj-class: Classical Analysis

   MSC-class: 42A

   Abstract: The Riemann-Lebesgue Lemma says that the Fourier transform of an absolutely integrable function on the real line tends to zero as the transform parameter tends to infinity. When the integral is allowed to converge conditionally, the transform can have arbitrarily rapid pointwise growth as the transform parameter tends to infinity. Smoothness of the function to be transformed need not decrease growth of the transform.

4. math.CA/0101065

Title: Bessel Integrals and Fundamental Solutions for a Generalized Tricomi Operator

Authors: J. Barros-Neto, Fernando Cardoso

Subj-class: Classical Analysis; Analysis of PDEs

MSC-class: 35M10 (primary) 46F10, 42B10 (secondary)

Abstract: Partial Fourier transforms are used to find explicit formulas for two remarkable fundamental solutions for a generalized Tricomi operator. These fundamental solutions reflect clearly the mixed type of the operator. In order to prove these results, we establish explicit formulas for Fourier transforms of some type of Bessel functions.

5. math.CA/0101073

Title: A proof of a multivariable elliptic summation formula conjectured by Warnaar

Authors: Hjalmar Rosengren

Comments: 10 pages

Subj-class: Classical Analysis; Quantum Algebra

MSC-class: 33D67; 33E05

Abstract: We prove a multivariable elliptic analogue of Jackson's ${}_8W_7$ summation formula, which was recently conjectured by S.O.Warnaar.

6. math.CA/0101105

Title: Orthogonal Polynomials in Analytical Method of Solving Differential Equations Describing Dynamics of Multilevel Systems

Authors: V.A.Savva, V.I.Zelenkov, A.S.Mazurenko

Comments: 8 pages, latex, no figures, see also `http://zelenkov.isir.minsk.by/physmath` and `http://www.geocities.com/amazurenko/papers.html`

Subj-class: Classical Analysis; Dynamical Systems

MSC-class: 33C48; 34C25

Journal-ref: Integral Transforms and Special Functions, 2000, Vol. 10, No. 3–4, pp. 299-308

Abstract: An effective method to obtain exact analytical solutions of equations describing the coherent dynamics of multilevel systems is presented. The method is based on the usage of orthogonal polynomials, integral transforms and their discrete analogues. All the obtained solutions are expressed by way of special or elementary functions.

7. math.CA/0101125

Title: Duality of orthogonal polynomials on a finite set

Authors: Alexei Borodin

Comments: AMSTeX, 9 pages

Subj-class: Classical Analysis; Probability Theory

Abstract: We prove a certain duality relation for orthogonal polynomials defined on a finite set. The result is used in a direct proof of the equivalence of two different ways of computing the correlation functions of a discrete orthogonal polynomial ensemble.

8. math.CA/0101168

Title: On the sums $\sum_{k=-\infty}^{\infty}(4k+1)^{(-n)}$.

Authors: Noam D. Elkies Comments: 13 pages. Written partly as an expository paper, and thus at somewhat greater length than would be appropriate for a purely research article on this material. Revised to correct minor errors: typos in equations (1) and (2), and an incomplete argument for Lemma 2, noticed respectively by Paul Krapivsky and Robin Chapman

Subj-class: Classical Analysis; Combinatorics

MSC-class: 11B68 (Primary) 05A15 (Secondary)

Abstract: The sum in the title is a rational multiple of π^n for all integers $n = 2, 3, 4, \ldots$ for which the sum converges absolutely. This is equivalent to a celebrated theorem of Euler. Of the many proofs that have appeared since Euler, a simple one was discovered only recently by Calabi: the sum is written as a definite integral over the unit n-cube, then transformed into the volume of a polytope Π_n in $\mathbb{R}^n$ whose vertices' coordinates are rational multiples of π. We review Calabi's proof, and give two further interpretations. First we define a simple linear operator T on $L^2(0, \pi/2)$, and show that T is self-adjoint and compact, and that $\mathrm{Vol}(\Pi_n)$ is the trace of T^n. We find that the spectrum of T is $\{1/(4k+1) : k \in Z\}$, with each eigenvalue $1/(4k+1)$ occurring with multiplicity 1; thus $\mathrm{Vol}(\Pi_n)$ is the sum of the n-th powers of these eigenvalues. We also interpret $\mathrm{Vol}(\Pi_n)$ combinatorially in terms of the number of alternating permutations of $n+1$ letters, and if n is even also in terms of the number of cyclically alternating permutations of n letters. We thus relate these numbers with $S(n)$ without the intervention of Bernoulli and Euler numbers or their generating functions.

9. math.CA/0102032

Title: Analytic continuation of the generalized hypergeometric series near unit argument with emphasis on the zero-balanced series

Authors: Wolfgang Buehring, H. M. Srivastava

Comments: 19 pages

Subj-class: Classical Analysis

MSC-class: 33C20, 34E05 (Primary) 41A58 (Secondary)

Journal-ref: Themistocles M. Rassias (Editor), Approximation Theory and Applications, Hadronic Press, Palm Harbor, FL 34682-1577, U.S.A., ISBN 1-57485-041-5, 1998, pp. 17-35

Abstract: Various methods to obtain the analytic continuation near $z = 1$ of the hypergeometric series ${}_{p+1}F_p(z)$ are reviewed together with some of the results. One approach is to establish a recurrence relation with respect to p and then, after its repeated use, to resort to the well-known properties of the Gaussian hypergeometric series. Another approach is based on the properties of the underlying generalized hypergeometric differential equation: For the coefficients in the power series expansion around $z = 1$ a general formula, valid for any p, is found in terms of a limit of a terminating Saalschützian hypergeometric series of unit argument. Final results may then be obtained for each particular p after application of an appropriate transformation formula of the Saalschützian hypergeometric series. The behaviour at unit argument of zero-balanced hypergeometric series, which have received particular attention in recent years, is discussed in more detail. The related problem involving the behaviour of partial sums of such series is addressed briefly.

10. math.CA/0102111

Title: Hermite functions and uncertainty principles for the Fourier and the windowed Fourier transforms

Authors: Aline Bonami, Bruno Demange, Philippe Jaming

Comments: 22 pages, submitted

Subj-class: Classical Analysis; Mathematical Physics

MSC-class: 42B10;32A15;94A12

Abstract: We extend an uncertainty principle due to Beurling into a characterization of Hermite functions. More precisely, all functions f on $\mathbb{R}^d$ which may be written as $P(x)\exp(Ax, x)$, with A a real symmetric definite positive matrix, are characterized by integrability conditions on the product $f(x)\hat{f}(y)$. We also give the best constant in uncertainty principles of Gelf'and Shilov type. We then obtain similar results for the windowed Fourier transform (also known, up to elementary changes of functions, as the radar ambiguity function or the Wigner transform). We complete the paper with a sharp version of Heisenberg's inequality for this transform.

11. math.CA/0102174

Title: Multilateral transformations of q-series with quotients of parameters that are nonnegative integer powers of q.

Author: Michael Schlosser

Categories: CA Classical Analysis (CO Combinatorics; QA Quantum Algebra)

Math Subject Class: 33D15; 33D67

From: Michael Schlosser,
mschloss@math.ohio-state.edu

Abstract: We give multidimensional generalizations of several transformation formulae for basic hypergeometric series of a specific type. Most of the upper parameters of the series differ multiplicatively from corresponding lower parameters by a nonnegative integer power of the base q. In one dimension, formulae for such series have been found, in the $q \to 1$ case, by B. M. Minton and P. W. Karlsson, and in the basic case by G. Gasper, by W. C. Chu, and more recently by the author. Our identities involve multilateral basic hypergeometric series associated to the root system A_r (or equivalently, the unitary group $U(r + 1)$).

12. math.CA/0103024

Title: A multidimensional generalization of Shukla's ${}_8\psi_8$ summation

Authors: Michael Schlosser (The Ohio State University)

Comments: 16 pages, AMS-LaTeX

Subj-class: Classical Analysis; Combinatorics; Quantum Algebra

MSC-class: 33D15; 33D6

From: Michael Schlosser,
mschloss@math.ohio-state.edu

Abstract: We give an r-dimensional generalization of H. S. Shukla's very-well-poised ${}_8\psi_8$ summation formula. We work in the setting of multiple basic hypergeometric series very-well-poised over the root system A_{r-1}, or equivalently, the unitary group $U(r)$. Our proof, which is already new in the one-dimensional case, utilizes an A_{r-1} nonterminating very-well-poised ${}_6\phi_5$ summation by S. C. Milne, a partial fraction decomposition, and analytic continuation.

13. math.CA/0103077

Title: The Heun equation and the Calogero-Moser-Sutherland system I: the Bethe Ansatz method

Authors: Kouichi Takemura

Comments: 34 pages

Subj-class: Classical Analysis; Quantum Algebra; Exactly Solvable and

Integrable Systems; Mathematical Physics

MSC-class: 82B23; 33E15

From: Kouichi TAKEMURA,
kouichi.takemura@math.yokohama-cu.ac.jp

Abstract: We propose and develop the Bethe Ansatz method for the Heun's equation. As an application, we justify the holomorphic perturbation for the 1-particle Inozemtsev model from the trigonometric model.

14. math.CA/0103131

Title: Some classical multiple orthogonal polynomials

Authors: Walter Van Assche, Els Coussement

Subj-class: Classical Analysis

MSC-class: 42C05; 33C45

Journal-ref: J. Comput. Appl. Math. 127 (2001), 317-347

From: Walter Van Assche,
walter@wis.kuleuven.ac.be

Abstract: Recently there has been a renewed interest in an extension of the notion of orthogonal polynomials known as multiple orthogonal polynomials. This notion comes from simultaneous rational approximation (Hermite-Pade approximation) of a system of several functions. We describe seven families of multiple orthogonal polynomials which have he same flavor as the very classical orthogonal polynomials of Jacobi, Laguerre and Hermite. We also mention some open research problems and some applications.

15. math.CA/0103184

Title: Symbolic Evaluation of Coefficients in Airy-type Asymptotic Expansions

Author: Raimundas Vidunas, Nico M. Temme

Categories: CA Classical Analysis

Math Subject Class: 41A60 (primary), 33C10, 33C15, 33F05, 65D20

Comments: 14 pages; with Maple routines

From: Raimundas Vidunas,
vidunas@science.uva.nl

Abstract: Computer algebra algorithms are developed for evaluating the coefficients in Airy-type asymptotic expansions that are obtained from integrals with a large parameter. The coefficients are defined from recursive schemes obtained from integration by parts. An application is given for the Weber parabolic cylinder function.

16. math.CA/0104035

Title: Index hypergeometric transform and imitation of analysis of Berezin kernels on hyperbolic spaces

Authors: Yurii Neretin

Comments: 33 pages

Report-no: ESI-1011

Subj-class: Classical Analysis; Representation Theory

From: Neretin Yurii.A.,
neretin@imada.sdu.dk

Abstract: We discuss properties of the index hypergeometric transform (it is named also the Jacobi transform or the Olevsky transform) interpolating analysis of Berezin kernels on rank 1 symmetric spaces. We discuss a unitary intertwining operator from L^2 on symmetric space to Berezin deformation of L^2. We also find images of some differential operators under the index transform.

17. math.CA/0104260

Title: Integral Transform and Segal-Bargmann Representation Associated to q-Charlier Polynomials

Author: Nobuhiro Asai

Categories: CA Classical Analysis (RT Representation Theory)

Math Subject Class: 33D45, 44A20,81S25,81R30

Comments: Accepted for the publication in "Quantum Information IV", T. Hida and K. Saito (eds.), World Scientific

From: Nobuhiro ASAI,
asai@iias.or.jp

Abstract: Let $\mu_p^{(q)}$ be the q-deformed Poisson measure in the sense of Saitoh Yoshida and ν_p be the measure given by Equation (3.6). In this short paper, we introduce the q-deformed analogue of the Segal-Bargmann transform associated with $\mu_p^{(q)}$. We prove that our Segal-Bargmann transform is a unitary map of $L^2(\mu_p^{(q)})$ onto the Hardy space $\mathcal{H}^2(\nu_q)$. Moreover, we give the Segal-Bargmann representation of the multiplication operator by x in $L^2(\mu_p^{(q)})$, which is a linear combination of the q-creation, q-annihilation, q-number, and scalar operators.

18. math.CA/0105093

Title: An expansion formula for the Askey-Wilson function

Author: Jasper V. Stokman

Categories: CA Classical Analysis (QA Quantum Algebra)

Math Subject Class: 33D45; 33D80

Comments: 24 pages. Some remarks added in section 6 on the connection with moment problems

Abstract: The Askey-Wilson function transform is a q-analogue of the Jacobi function transform with kernel given by an explicit non-polynomial eigenfunction of the Askey-Wilson second order q-difference operator. The kernel is called the Askey-Wilson function. In this paper an explicit expansion formula for

the Askey-Wilson function in terms of Askey-Wilson polynomials is proven. With this expansion formula at hand, the image under the Askey-Wilson function transform of an Askey-Wilson polynomial multiplied by an analogue of the Gaussian is computed explicitly. As a special case of these formulas a q-analogue (in one variable) of the Macdonald-Mehta integral is obtained, for which also two alternative, direct proofs are presented.

19. math.CO/0102073

Title: Variants of the Andrews-Gordon Identities

Authors: A. Berkovich, P. Paule

Comments: 12 pages, 1 figure

Subj-class: Combinatorics; Number Theory; Quantum Algebra

MSC-class: 05A10, 05A19, 11B65, 11P82

Abstract: The object of this paper is to propose and prove a new generalization of the Andrews-Gordon identities, extending a recent result of Garrett, Ismail and Stanton. We also give a combinatorial discussion of the finite form of their result, which appeared in the work of Andrews, Knopfmacher, and Paule.

20. math.CO/0102106

Title: A computer proof of a polynomial identity implying a partition theorem of Goellnitz

Authors: A. Berkovich, A. Riese

Comments: 12 pages, to appear in Adv. Appl. Math

Subj-class: Combinatorics; Number Theory; Quantum Algebra

MSC-class: 05A19, 05A30, 11P82, 33F10

Abstract: In this paper we give a computer proof of a new polynomial identity, which extends a recent result of Alladi and the first author. In addition, we provide computer proofs for new finite analogs of Jacobi and Euler formulas. All computer proofs are done with the aid of the new computer algebra package qMultiSum developed by the second author. qMultiSum implements an algorithmic refinement of Wilf and Zeilberger's multi-q-extension of Sister Celine's technique utilizing additional ideas of Verbaeten and Wegschaider.

21. math.CO/0104026

Title: Gamma function, Beta function and combinatorial identities

Authors: T. Mansour

Comments: 9 pages

Subj-class: Combinatorics

From: Toufik Mansour,
tmansur@study.haifa.ac.il

22. math.CO/0104053

Title: Lattice paths, q-multinomials and two variants of the Andrews-Gordon identities

Authors: Alexander Berkovich, Peter Paule

Comments: 15 pages, 9 figures

Subj-class: Combinatorics; Number Theory; Quantum Algebra

MSC-class: 05A10, 05A19, 11B65, 11P82

From: Alexander Berkovich,
alexb@math.ufl.edu

Abstract: A few years ago Foda, Quano, Kirillov and Warnaar proposed and proved various finite analogs of the celebrated Andrews-Gordon identities. In this paper we use these polynomial identities along with the combinatorial techniques introduced in our recent paper to derive Garrett, Ismail, Stanton type formulas for two variants of the Andrews-Gordon identities.

23. math.CO/0104137

Title: Bell numbers, log-concavity, and log-convexity

Authors: Nobuhiro Asai, Izumi Kubo, Hui-Hsiung Kuo

Comments: Louisiana state university preprint (1999)

Subj-class: Combinatorics

MSC-class: 11B73;26A12;60H40

Journal-ref: Acta Appl. Math., 63 (2000) 79–87

From: Nobuhiro ASAI,
asai@iias.or.jp

Abstract: Let $\{b_k(n)\}_{n=0}^{\infty}$ be the Bell numbers of order k. It is proved that the sequence $\{b_k(n)/n!\}_{n=0}^{\infty}$ is log-concave and the sequence $\{b_k(n)\}_{n=0}^{\infty}$ is log-convex, or equivalently, the following inequalities hold for all $n \geq 0$,

$$1 \leq \frac{b_k(n+2)b_k(n)}{b_k(n+1)^2} \leq \frac{n+2}{n+1}.$$

Let $\{\alpha(n)\}_{n=0}^{\infty}$ be a sequence of positive numbers with $\alpha(0) = 1$. We show that if $\{\alpha(n)\}_{n=0}^{\infty}$ is log-convex, then

$$\alpha(n)\alpha(m) \leq \alpha(n+m), \quad \forall n, m \geq 0.$$

On the other hand, if $\{\alpha(n)/n!\}_{n=0}^{\infty}$ is log-concave, then

$$\alpha(n+m) \leq \binom{n+m}{n}\alpha(n)\alpha(m), \quad \forall n, m \geq 0.$$

In particular, we have the following inequalities for the Bell numbers

$$b_k(n)b_k(m) \leq b_k(n+m) \leq \binom{n+m}{n}b_k(n)b_k(m), \quad \forall n, m \geq 0.$$

Then we apply these results to white noise distribution theory.

Abstract: In this note we present a method for obtaining a wide class of combinatorial identities. We give several examples, in particular, based on the Gamma and Beta functions. Some of them have already been considered by previously, and other are new.

24. math.CO/0104241

Title: The Laurent phenomenon

Authors: Sergey Fomin, Andrei Zelevinsky

Comments: 21 pages

Subj-class: Combinatorics

MSC-class: 14E05

From: Sergey Fomin,
fomin@math.lsa.umich.edu

Abstract: A composition of birational maps given by Laurent polynomials need not be given by Laurent polynomials; however, sometimes—quite unexpectedly—it does. We suggest a unified treatment of this phenomenon, which covers a large class of applications. In particular, we settle in the affirmative a conjecture of D.Gale and R.Robinson on integrality of generalized Somos sequences, and prove the Laurent property for several multidimensional recurrences, confirming conjectures by J.Propp, N.Elkies, and M.Kleber.

25. math.QA/0101136

Title: Special functions, conformal blocks, Bethe ansatz, and $SL(3,Z)$

Authors: G. Felder, A. Varchenko

Comments: 10 pages, AMSLaTeX

Subj-class: Quantum Algebra; Mathematical Physics

MSC-class: 81T40; 33C67

Abstract: This is the talk of the second author at the meeting "Topological Methods in Physical Sciences", London, November 2000. We review our work on KZB equations.

26. math.QA/0101178

Title: q-Analogues for Green functions for powers of the invariant Laplacian in the unit disc

Author: D. Shklyarov

Comments: LaTeX 2e, 18 pages, vaksman@ilt.kharkov.ua

Subj-class: Quantum Algebra; Complex Variables; Functional Analysis

MSC-class: 81R50 (Primary) 81Q99 (Secondary)

Journal-ref: Mathematical physics, analysis, geometry (Kharkov Mathematical Journal), v.7, 2000, p.345-365

Abstract: In a recent work of J. Peetre and M. Engliš explicit formulae were obtained for Green functions of the powers of the Möbius-invariant Laplace operator in the unit disc. In the present work their q-analogues for the first and the second powers are obtained. By the way a q-analogue of the dilogarithm in Rogers' form arises.

27. math.QA/0101259

Title: The integral representations of the q-Bessel-Macdonald functions

Authors: V.-B.K. Rogov

Comments: 10 pages, Latex

Subj-class: Quantum Algebra

MSC-class: 22Exx

Abstract: The q-Bessel-Macdonald functions of kinds 1, 2 and 3 are considered. Their representations by classical integral are constructed.

28. math.QA/0103096

Title: Projectively equivariant quantization and symbol calculus: noncommutative hypergeometric functions

Authors: C. Duval, V. Ovsienko

Comments: 9 pages, LaTeX

Report-no: CPT-2001/P.4145

Subj-class: Quantum Algebra; Differential Geometry

From: Valentin Ovsienko,
Valentin.Ovsienko@cpt.univ-mrs.fr

Abstract: We extend projectively equivariant quantization and symbol calculus to symbols of pseudo-differential operators. An explicit expression in terms of hypergeometric functions with noncommutative arguments is given. Some examples are worked out, one of them yielding a quantum length element on S^3.

29. math.QA/0104268

Title: Crystal bases and q-identities

Authors: Masato Okado, Anne Schilling, Mark Shimozono

Categories: QA Quantum Algebra (MP Mathematical Physics)

Math Subject Class: 81R10; 17B65; 05A30; 82B20; 82B23; 05A17

Comments: 25 pages, style file axodraw.sty required

From: Anne Schilling,
anne@math.mit.edu

Abstract: The relation of crystal bases with q-identities is discussed, and some new results on crystals and q-identities associated with the affine Lie algebra $C_n^{(1)}$ are presented.

30. math.QA/0105061

Title: Nonsymmetric Macdonald polynomials and Demazure characters

Author: Bogdan Ion

Categories: QA Quantum Algebra (RT Representation Theory)

Comments: 15 pages

From: Bogdan Ion,
bogdan@math.princeton.edu

Abstract: We establish a connection between a specialization of the nonsymmetric Macdonald polynomials and the Demazure characters of the corresponding affine Kac-Moody algebra. This allows us to obtain a representation-theoretical interpretation of the coefficients of the expansion of the specialized symmetric Macdonald polynomials in the basis formed by the irreducible characters of the associated finite Lie algebra.

31. math.AP/0101113

Title: Fundamental Solutions for the Tricomi Operator, II

Authors: J. Barros-Neto, Israel M. Gelfand

Subj-class: Analysis of PDEs; Classical Analysis

MSC-class: 35M10; 33C05

Abstract: We explicitly calculate fundamental solutions for the Tricomi operator relative to a point in the hyperbolic region and show that these solutions originate from the hypergeometric function $F(1/6, 1/6; 1; z)$.

32. math.CV/0104051

Title: Zeta functions for Riemann zeros

Authors: A. Voros (CEA/Saclay, SPhT - CNRS, Ura, France)

Comments: latex txt.tex, 1 file, 18 pages [SPhT-T01/033]

Report-no: SPhT-T01/033

Subj-class: Complex Variables; Number Theory

MSC-class: 11Mxx (Primary) 30B40 30B50 (Secondary)

From: voros@spht.saclay.cea.fr (Andre Voros)

Abstract: Various Zeta functions built as Dirichlet series over the Riemann zeros are shown to have meromorphic extensions in the whole complex plane, for which numerous analytical features (the polar structure, and countably many sum rules) are explicitly displayed.

33. math.GM/0102031

Title: Riemann hypothesis and Superconformal Invariance

Authors: Matti Pitkanen

Comments: 17 pages, addition of new material about realization of superconformal symmetry

Subj-class: General Mathematics

Abstract: A strategy for proving (not a proof of, as was the first over-optimistic belief) the Riemann hypothesis is suggested. The vanishing of Riemann Zeta reduces to an orthogonality condition for the eigenfunctions of a non-Hermitian operator D^+ having the zeros of Riemann Zeta as its eigenvalues. The construction of D^+ is inspired by the conviction that Riemann Zeta is associated with a physical system allowing superconformal transformations as its symmetries and second quantization in terms of the representations of superconformal algebra. The eigenfunctions of D^+ are analogous to the so called coherent states and in general not orthogonal to each other. The states orthogonal to a vacuum state (having a negative norm squared) correspond to the zeros of Riemann Zeta. The physical states having a positive norm squared correspond to the zeros of Riemann Zeta at the critical line. Riemann hypothesis follows by reductio ad absurdum from the hypothesis that ordinary superconformal algebra acts as gauge symmetries for all coherent states orthogonal to the vacuum state, including also the non-physical coherent states that might exist off from the critical line.

34. math.NT/0104249

Title: Irrationality of values of zeta-function

Author: Wadim Zudilin

Categories: NT Number Theory (CA Classical Analysis)

Math Subject Class: Primary 11J72; Secondary 33C60

Comments: 8+8 pages (English+Russian); to appear in the Proceedings of the Conference of Young Scientists (Moscow University, April 9-14, 2001)

From: Wadim Zudilin,
wadim@ips.ras.ru

Abstract: We present several results on the number of irrational and linear independent values among $\zeta(s), \zeta(s+2), ..., \zeta(s+2n)$, where $s > 2$ is an odd integer and $n > 0$ is an integer. The main tool in our proofs is a certain generalization of Rivoal's construction.

35. math.NT/0104221

Title: Irrationalite d'au moins un des neuf nombres $\zeta(5), \zeta(7), \ldots, \zeta(21)$

Author: Tanguy Rivoal

Categories: NT Number Theory

Math Subject Class: 11J72

Comments: 13 pages, submitted to Acta Arithmetica

From: Rivoal Tanguy,
rivoal@math.unicaen.fr

Abstract: We prove that there is at least one irrationnal among the nine numbers $\zeta(5), \zeta(7), \ldots, \zeta(21)$.

36. math.NT/0104176

Title: On a two-variable zeta function for number fields

Authors: Jeffrey C. Lagarias, Eric Rains

Comments: 50 pages Latex, one figure; typo in abstract corrected

Subj-class: Number Theory; Algebraic Geometry; Complex Variables

MSC-class: 11M41 Primary, 14G40, 60E37 Secondary

From: Jeffrey C Lagarias,
jcl@research.att.com

Abstract: This paper studies a zeta function of two complex variables (w, s) attached to an algebraic number field K, introduced by van der Geer and Schoof, which is based on an analogue of the Riemann-Roch theorem for number fields using Arakelov divisors. We mainly consider the case of the rational field Q, where for $w = 1$ one recovers the Riemann zeta function with the factors at infinity added. The analogue of the Riemann ξ-function analytically continues to an entire function of two complex variables, and satisfies a functional equation holding w fixed and sending s to $w - s$. For real w the "critical line" is therefore $Re(s) = w/2$. We study the zero set of this function. For fixed nonnegative real w the zeros are confined to a vertical strip in s and have the same asymptotics as zeta zeros. For negative real w we show there are no zeros on the critical line, i.e. an anti-Riemann hypothesis. There is associated to this a positive convolution semigroup of infinitely divisible probability distributions.

37. math.NT/0104178

Title: Arithmetic theory of q-difference equations. The q-analogue of Grothendieck-Katz's conjecture on p-curvatures

Authors: Lucia Di Vizio

Comments: 45 pages

Subj-class: Number Theory; Quantum Algebra

MSC-class: 12H99 (33D15, 39A13)

From: Lucia Di Vizio,
divizio@math.jussieu.fr

Abstract: Grothendieck's conjecture on p-curvatures predicts that an arithmetic differential equation has a full set of algebraic solutions if and only if its reduction in positive characteristic has a full set of rational solutions for almost all finite places. It is equivalent to Katz's conjectural description of the generic Galois group. In this paper we prove an analogous statement for arithmetic q-difference equation.

38. math.RT/0101006

Title: A generating function for the trace of the Iwahori-Hecke algebra

Authors: Eric M. Opdam

Subj-class: Representation Theory

MSC-class: 20C08, 22D25, 22E35

Abstract: The Iwahori-Hecke algebra has a "natural" trace τ. This trace is the evaluation at the identity element in the usual interpretation of the Iwahori-Hecke algebra as a sub-algebra of the convolution algebra of a p-adic semi-simple group. The Iwahori-Hecke algebra contains an important commutative sub-algebra $\mathbf{C}[\theta_x]$, that was described and studied by Bernstein, Zelevinski and Lusztig. In this note we compute the generating function for the value of τ on the basis θ_x.

39. math.RT/0101007

Title: On the spectral decomposition of affine Hecke algebras

Authors: Eric M. Opdam

Subj-class: Representation Theory

MSC-class: 20C08, 22D25, 22E35, 43A32

Abstract: An affine Hecke algebra H contains a large abelian subalgebra A. The center Z of H is the subalgebra of Weyl group invariant elements in A. The trace of the affine Hecke algebra can be written as an integral of a rational n form (with values in the linear dual of H over a certain cycle in the algebraic torus $T = \sigma(A)$. We shall derive the Plancherel formula of the affine Hecke algebra by localization of this integral on a certain subset of $\sigma(Z)$.

40. cond-mat/0101464

Title: Solution of a Generalized Stieltjes Problem

Authors: B. Sriram Shastry, Abhishek Dhar

Comments: 19 pages, 4 figures

Subj-class: Condensed Matter; Exactly Solvable and Integrable

Systems; Mathematical Physics; Classical Analysis

We present the exact solution for a set of nonlinear algebraic equations $\frac{1}{z_l} = \pi d + \frac{2d}{n}\sum_{m\neq l}\frac{1}{z_l - z_m}$. These were encountered by us in a recent study of the low energy spectrum of the Heisenberg ferromagnetic chain. These equations are low d (density) "degenerations" of more complicated transcendental equation of Bethe's Ansatz for a ferromagnet, but are interesting in themselves. They generalize, through a single parameter, the equations of Stieltjes, $x_l = \sum_{m\neq l} 1/(x_l - x_m)$, familiar from Random Matrix theory.

It is shown that the solutions of these set of equations is given by the zeros of generalized associated Laguerre polynomials. These zeros are interesting, since they provide one of the few known cases where the location is along a nontrivial curve in the complex plane that is determined in this work.

Using a "Green's function" and a saddle point technique we determine the asymptotic distribution of zeros.

41. hep-th/0102039

Title: A_N-type Dunkl operators and new spin Calogero-Sutherland models

Authors: F. Finkel, D. Gomez-Ullate, A. Gonzalez-Lopez, M.A. Rodriguez, R. Zhdanov

Comments: 18 pages. Typeset using LaTeX with amslatex and revtex 4 packages

Subj-class: High Energy Physics - Theory; Mathematical Physics; Exactly Solvable and Integrable Systems

Abstract: A new family of A_N-type Dunkl operators preserving a polynomial subspace of finite dimension is constructed. Using a general quadratic combination of these operators and the usual Dunkl operators, several new families of exactly and quasi-exactly solvable quantum spin Calogero-Sutherland models are obtained. These include, in particular, three families of quasi-exactly solvable elliptic spin Hamiltonians.

42. hep-th/0102180

Title: Unitary representations of $U_q(\mathfrak{sl}(2,\mathbb{R}))$, the modular double, and the multiparticle q-deformed Toda chains

Authors: S. Kharchev, D. Lebedev, M. Semenov-Tian-Shansky

Comments: AmsLatex, 41 pages, 3 figures

Subj-class: High Energy Physics - Theory; Quantum Algebra; Exactly

Solvable and Integrable Systems

Abstract: The paper deals with the analytic theory of the quantum q-deformed Toda chain; the technique used combines the methods of representation theory and the Quantum Inverse Scattering Method. The key phenomenon which is under scrutiny is the role of the modular duality concept (first discovered by L.Faddeev) in the representation theory of noncompact semisimple quantum groups. Explicit formulae for the Whittaker vectors are presented in terms of the double sine functions and the wave functions of the N-particle q-deformed open Toda chain are given as a multiple integral of the Mellin-Barnes type. For the periodic chain the two dual Baxter equations are derived.

43. hep-th/0103178

Title: Supersymmetric Calogero-Moser-Sutherland models and Jack superpolynomials

Authors: P. Desrosiers, L. Lapointe, P. Mathieu

Comments: Latex 2e, 30 pages

Subj-class: High Energy Physics - Theory; Mathematical Physics; Exactly Solvable and Integrable Systems; Quantum Algebra

From: Pierre Mathieu,
pmathieu@phy.ulaval.ca

Abstract: A new generalization of the Jack polynomials that incorporates fermionic variables is presented. These Jack superpolynomials are constructed as those eigenfunctions of the supersymmetric extension of the trigonometric Calogero-Moser-Sutherland (CMS) model that decomposes triangularly in terms of the symmetric monomial superfunctions. Many explicit examples are displayed. Furthermore, various new results have been obtained for the supersymmetric version of the CMS models: the Lax formulation, the construction of the Dunkl operators and the explicit expressions for the conserved charges. The reformulation of the models in terms of the exchange-operator formalism is a crucial aspect of our analysis.

44. hep-th/0103190

Title: New spin Calogero-Sutherland models related to B_N-type Dunkl operators

Authors: F. Finkel, D. Gomez-Ullate, A. Gonzalez-Lopez, M.A. Rodriguez, R. Zhdanov

Comments: 18 pages, typeset in LaTeX 2e using revtex 4.0b5 and the amslatex package Minor changes in content, one reference added

Subj-class: High Energy Physics - Theory; Mathematical Physics; Exactly Solvable and Integrable Systems

From: Artemio Gonzalez-Lopez,
artemio@ciruelo.fis.ucm.es

Abstract: We construct several new families of exactly and quasi-exactly solvable BC_N-type Calogero-Sutherland models with internal degrees of freedom. Our approach is based on the introduction of two new families of Dunkl operators of B_N type which, together with the original B_N-type Dunkl operators, are shown to preserve certain polynomial subspaces of finite dimension. We prove that a wide class of quadratic combinations involving these three sets of Dunkl operators always yields a spin Calogero-Sutherland model, which is (quasi-)exactly solvable by construction. We show that all the spin Calogero-Sutherland models obtainable within this framework can be expressed in a unified way in terms of a Weierstrass P function with suitable half-periods. This provides a natural spin counterpart of the well-known general formula for a scalar completely integrable potential of BC_N type due to Olshanetsky and Perelomov. As an illustration of our method, we exactly compute several energy levels and their corresponding wavefunctions of an elliptic quasi-exactly solvable potential for two and three particles of spin 1/2.

45. math-ph/0102007

Title: On the Motion of Zeros of Zeta Functions

Authors: Hans Frisk, Serge de Gosson

Comments: 11 pages, 3 figures (better image resolution available on this http URL)

Subj-class: Mathematical Physics

MSC-class: 11M06

Abstract: The motion in the complex plane of the zeros to various zeta functions is investigated numerically. First the Hurwitz zeta function is considered and an accurate formula for the distribution of its zeros is suggested. Then functions which are linear combinations of different Hurwitz zeta functions, and have a symmetric distribution of their zeros with respect to the critical line, are examined. Finally the existence of the hypothetical non-trivial Riemann zeros with $Re(s) \neq 1/2$ is discussed.

46. math-ph/0102020

Title: Laplace transform of spherical Bessel functions

Authors: A. Ludu, R. F. O'Connell

Comments: 5 pages LATEX, no figures

Subj-class: Mathematical Physics; Algebraic Geometry

Abstract: We provide a simpler analytic formula for the Laplace transform $\tilde{j}_l(p)$ of the spherical Bessel function than that appearing in the literature, and we show that any such integral transform is a polynomial of order l in the variable p with constant coefficients for the first $l-1$ powers, and with an inverse tangent function of argument $1/p$ as the coefficient of the power l.

47. math-ph/0102026

Title: The Darboux Transform and some Integrable cases of the q-Riccati Equation

Authors: A. Odzijewicz, A. Ryzko

Comments: 11 pages LATEX

Subj-class: Mathematical Physics

Abstract: Using the q-version of the Darboux transform we obtain the general solution of q-difference Riccati equation from a special one by the action of one-parameter group. This allows us to construct the solutions for the latge class of q-difference Riccati equations as well as q-difference Schrodinger equations

48. nlin.SI/0101056

Title: A Determinant Formula for a Class of Rational Solutions of Painlevé V Equation

Authors: Tetsu Masuda, Yasuhiro Ohta, Kenji Kajiwara

Comments: 17 pages

Subj-class: Exactly Solvable and Integrable Systems

Abstract: We give an explicit determinant formula for a class of rational solutions of the Painlevé V equation in terms of the universal characters.

49. nlin.SI/0102020

Title: Special Functions of the Isomonodromy Type, Rational Transformations of Spectral Parameter, and Algebraic Solutions of the Sixth Painlevé Equation

Author: A. V. Kitaev

Comments: 13 pages

Subj-class: Exactly Solvable and Integrable Systems

Abstract: We discuss relations which exist between analytic functions belonging to the recently introduced class of special functions of the isomonodromy type (SFITs). These relations can be obtained by application of some simple transformations to auxiliary ODEs with respect to a spectral parameter which associated with each SFIT. We consider two applications of rational transformations of the spectral parameter in the theory of SFITs. One of the most striking applications which is considered here is an explicit construction of algebraic solutions of the sixth Painlevé equation.

50. nlin.SI/0104019

Title: Discrete systems related to some equations of the Painlevé-Gambier classification

Authors: S. Lafortune, B. Grammaticos, A. Ramani, P. Winternitz

Comments: 10 pages

Subj-class: Exactly Solvable and Integrable Systems

Journal-ref: Physics Letters A 270, 55-61 (2000)

From: Lafortune,
lafortus@crm.umontreal.ca

Abstract: We derive integrable discrete systems which are contiguity relations of two equations in the Painlevé-Gambier classification depending on some parameter. These studies extend earlier work where the contiguity relations for the six transcendental Painlevé equations were obtained. In the case of the Gambier equation we give the contiguity relations for both the continuous and the discrete system.

Problems and Solutions

Thus far 22 problems have been submitted, seven of which have been solved in previous issues. Still unsolved are Problems #**3**, **5**, **8**, **9**, **11**, **12**, **13**, **15**, **17**, **18**, **19**, **20**, **21** and **22**. This time no new problems have been submitted.

19. Uniform Bounds for Shifted Jacobi Multiplier Sequences. For Fourier series the following is immediate: Suppose the real or complex sequence $\{m_k\}$ generates a bounded operator on $L^p(\mathbf{T})$, $1 \le p \le \infty$, i.e., for polynomial f

$$\Big\| \sum m_k \hat{f}_k e^{ik\varphi} \Big\|_{L^p(\mathbf{T})} \le \|m\|_{M^p(\mathbf{T})} \Big\| \sum \hat{f}_k e^{ik\varphi} \Big\|_{L^p(\mathbf{T})} ,$$

then one has for the shifted sequence $\{m_{k+j}\}_{k\in\mathbf{Z}}$ that

$$\sup_{j\in\mathbf{N}_0} \|\{m_{k+j}\}\|_{M^p(\mathbf{T})} \le C \, \|m\|_{M^p(\mathbf{T})} , \; 1 \le p \le \infty . \quad (1)$$

Looking at cosine expansions on $L^p(0,\pi)$ one easily derives the analog of (1) via the addition formula

$$\cos(k \pm j)\theta = \cos k\theta \cos j\theta \mp \sin k\theta \sin j\theta$$

provided the periodic Hilbert transform is bounded, i.e., for $1 < p < \infty$. More generally, by Muckenhoupt's transplantation theorem [2, Theorem 1.6],

$$\Big(\int_0^\pi \Big| \sum m_{k+j} \, a_k \, P_k^{(\alpha,\beta)}(\cos\theta) \Big|^p \sin^{2\alpha+1}\frac{\theta}{2} \cos^{2\beta+1}\frac{\theta}{2} \, d\theta \Big)^{1/p}$$

$$\equiv \Big(\int_0^\pi \Big| \sum m_{k+j} \, b_k \, \phi_k^{(\alpha,\beta)}(\cos\theta) \Big|^p w_{\alpha,\beta,p}(\theta) \, d\theta \Big)^{1/p}$$

$$\approx \Big(\int_0^\pi \Big| \sum m_{k+j} \, b_k \, \cos k\theta \Big|^p w_{\alpha,\beta,p}(\theta) \, d\theta \Big)^{1/p} ,$$

where $P_k^{(\alpha,\beta)}$ are the Jacobi polynomials, $\phi_k^{(\alpha,\beta)}(\cos\theta)$ are the orthonormalized Jacobi functions with respect to $d\theta$, and

$$w_{\alpha,\beta,p}(\theta) = \sin^{(2-p)(\alpha+1/2)}\frac{\theta}{2} \cos^{(2-p)(\beta+1/2)}\frac{\theta}{2} .$$

Therefore, the above argument for cosine expansions also applies to Jacobi expansions provided the periodic Hilbert transform is bounded with respect to the weight function $w_{\alpha,\beta,p}$; hence, the analog of (1) holds for Jacobi expansions when

$$\frac{2\alpha+2}{\alpha+3/2} < p < \frac{2\alpha+2}{\alpha+1/2} , \qquad \alpha \ge \beta \ge -\frac{1}{2} .$$

(i) Can the above p-range be extended? By Muckenhoupt [2, (1.3)], a fixed shift is bounded for all p, $1 < p < \infty$.

(ii) Consider the corresponding problem for Laguerre expansions (for the appropriate setting see [1]); a fixed shift is easily seen to be bounded for all $p \ge 1$.

Both questions are of course trivial for $p = 2$ since $\ell^\infty = M^2$ by Parseval's formula.

References

[1] Gasper, G. and W. Trebels: On necessary multiplier conditions for Laguerre expansions, Canad. J. Math. 43 (1991), 1228 – 1242.

[2] Muckenhoupt, B.: Transplantation Theorems and Multiplier Theorems for Jacobi Series, Memoirs Amer. Math. Soc., Vol. 64, No. 356, Providence, R.I., 1986.

(Submitted on May 19, 1998)

George Gasper
(george@math.nwu.edu)
Walter Trebels
(trebels@mathematik.tu-darmstadt.de)

20. Question about Elliot's formula Generalization of Legendre's identity for complete elliptic integrals

Let E, K be the complete elliptic integrals. Then

$$K'E + KE' - KK' = \pi/2 \qquad (*)$$

This is the special case $p = r = -a+1/2$, $q = c+a-3/2$ in Elliott's identity (see Erdelyi e.a., Higher Transcendental Functions, Vol. 1, p. 85):

$$\begin{aligned} &F(p+\tfrac12,-r-\tfrac12,1+p+q;z)F(-p+\tfrac12,r+\tfrac12;1+q+r;1-z) \\ &+F(p+\tfrac12,-r+\tfrac12,1+p+q;z)F(-p-\tfrac12,r+\tfrac12;1+q+r;1-z) \\ &-F(p+\tfrac12,-r+\tfrac12,1+p+q;z)F(-p+\tfrac12,r+\tfrac12;1+q+r;1-z) \\ &= \frac{\Gamma(p+q+1)\Gamma(q+r+1)}{\Gamma(p+q+r+\frac32)\Gamma(q+\frac12)} \qquad (**) \end{aligned}$$

Question 1. Is there a counterpart of Legendre's identity (*) for incomplete elliptic integrals?

Question 2. The Elliott identity (**) provides a generalization of the identity (*) to hypergeometric functions. The only handbook where I have seen this identity is Bateman vol. I. Has Elliott's identity been used or mentioned elsewhere in papers/books?

Question 3. Are there generalizations of the Elliott identity (**) to the ${}_pF_q$ case or to other generalizations of hypergeometric functions?

Matti Vuorinen
(vuorinen@csc.fi)

21. Question on an exact solvable Schrödinger equation

What are all the Schrödinger equations that have exact solutions expressible in terms of the Kampé de Fériet function?

(Submitted on June 3, 1999)

Ernst Davidovich Krupnikov
(ernst@neic.nsk.su)

22. Question about Kampé de Fériet series

How to prove the following reduction identities for the Kampé de Fériet series:

$$\mathrm{F}^{1:1;3}_{1:0;2}\left(\begin{matrix}2\\5/2\end{matrix}\,\middle|\,\begin{matrix}1\\-\end{matrix}\,\middle|\,\begin{matrix}1,1,1\\2,2\end{matrix}\,\middle|\,x,x\right) = {}_2\mathrm{F}_1\left(\begin{matrix}1,1\\3/2\end{matrix}\,\middle|\,x\right)\,{}_3\mathrm{F}_2\left(\begin{matrix}1,1,1\\3/2,2\end{matrix}\,\middle|\,x\right), \tag{2}$$

$$\mathrm{F}^{2:1;3}_{2:0;2}\left(\begin{matrix}2,2\\5/2,3\end{matrix}\,\middle|\,\begin{matrix}1\\-\end{matrix}\,\middle|\,\begin{matrix}1,1,1\\2,2\end{matrix}\,\middle|\,x,x\right) = \left[{}_3\mathrm{F}_2\left(\begin{matrix}1,1,1\\3/2,2\end{matrix}\,\middle|\,x\right)\right]^2, \tag{3}$$

$$\mathrm{F}^{2:1;2}_{2:0;1}\left(\begin{matrix}2,2\\3,3\end{matrix}\,\middle|\,\begin{matrix}1\\-\end{matrix}\,\middle|\,\begin{matrix}1,1\\2\end{matrix}\,\middle|\,1,1\right) = 4\,{}_4\mathrm{F}_3\left(\begin{matrix}1,1,1,1\\2,2,2\end{matrix}\,\middle|\,1\right), \tag{4}$$

$$\mathrm{F}^{3:1;2}_{3:0;1}\left(\begin{matrix}2,2,2\\3,3,3\end{matrix}\,\middle|\,\begin{matrix}1\\-\end{matrix}\,\middle|\,\begin{matrix}1,1\\2\end{matrix}\,\middle|\,1,1\right) = 2\,{}_5\mathrm{F}_4\left(\begin{matrix}1,1,1,1,1\\2,2,2,2\end{matrix}\,\middle|\,1\right)? \tag{5}$$

Is it possible to generalize them?

Ernst Davidovich Krupnikov
(ernst@neic.nsk.su)

Miscellaneous

1. Request for Information for DLMF Project

The Web site for the DLMF (Digital Library of Mathematical Functions) is `http://dlmf.nist.gov`. For a long time the information there was very limited but that is beginning to change. Authors are writing chapters, and as these take shape details are being posted at the Web site.

The DLMF will include selected typical applications of the various special functions, especially in physics. The following message from Dick Askey, a DLMF author as well as a DLMF Associate Editor, asks the readers of this list to help by providing examples. Please send them to `opsftalk@nist.gov`. For information about the OPSF-Talk List Service and access to the OPSF-Talk Archive, see `http://math.nist.gov/opsf`.

I am general editor for the DLMF project. The other primary editors are Frank Olver (mathematics), Charles Clark (scientific applications), and Ron Boisvert (information technology). The associate editors are named at the Web site.

Daniel W. Lozier
(`lozier@nist.gov`)

`From: Richard Askey <askey@math.wisc.edu>`

`Subject: Request for information`

As many of you know, NIST is doing a revision of the Handbook of Mathematical Functions, now titled "The digital library of mathematical functions". In addition to including important facts about many special functions, there is a need to include references to uses of them. Each of us knows some, but collectively we know much more. It would be useful to the authors of the individual chapters if people sent examples of important uses of the usual special functions and their properties.

Let me give an example of how an old handbook was used to suggest an interesting property of Legendre polynomials, and then mention a use of the inequalities which were suggested by one graph in Jahnke and Emde.

When Legendre polynomials are graphed on $(-1,1)$ a number of things are suggested. First, all the zeros lie in this interval. Second, the polynomials are bounded by 1 in absolute value on this interval. Third, if the absolute values of the successive extrema are considered, they decrease when going from 1 to 0. All of these facts had been observed and proved more than 100 years ago. About 55 years ago, John Todd looked carefully at a graph consisting of $P_n(x)$ on $(0,1)$ for $n = 1, 2, \ldots 7$. He noticed that the first minimum value of each of these functions when you look back from 1 seems to be an increasing function of n, the first maximum seems to be decreasing, and so on. These extrema have limits of the extrema of the Bessel function $J_0(x)$. In a few years a proof was found by Gabor Szegő, extended to ultraspherical polynomials suitably normalized by Otto Szász, and a similar result was found for Hermite polynomials when suitably normalized. For many years these inequalities sat there as beautiful results but without serious use.

The result for Legendre polynomials was rediscovered by Cornille and Martin in some work on pi-pi scattering. They also found a different weighted result for ultraspherical polynomials. Between the publication of their first paper and their second, someone told them of Szego's work. References are given in my SIAM regional conference lectures. It would have helped Cornille and Martin if this result had been included in a book they looked at. As we all know, results which are not eventually published in a book are very likely to get lost. Also, users of special functions will find it helpful to know the general areas in which these functions are used. Finally, mathematicians need to know about the uses of the functions since the users frequently need something just a little bit different than what mathematicians have done.

There is another graph in Jahnke and Emde which was not looked at for even longer. This is a graph of $Q_n(x)$ on $(0,1)$ for $n = 1, 2, 3, 4, 5$. A similar monotonicity result is suggested by this graph, and has been proven. I don't know applications of it, but strongly suspect there will be some.

I am writing the chapters on gamma and beta functions and on higher hypergeometric series. Any references which can be sent about uses of these functions would be helpful. I am sure that the other authors would also find it useful to hear about applications of the functions they are writing about. To avoid duplication, it would be best to send them to the list `opsftalk@nist.gov` and Dan Lozier can forward them the author of the chapter if necessary.

Thanks in advance for help.

Richard Askey
(`askey@math.wisc.edu`)

About the Activity Group

The SIAM Activity Group on Orthogonal Polynomials and Special Functions consists of a broad set of mathematicians, both pure and applied. The Group also includes engineers and scientists, students as well as experts. We have around 150 members scattered about in more than 20 countries. Whatever your specialty might be, we welcome your participation in this classical, and yet modern, topic. Our WWW home page is:

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

which currently covers the topics: Conference Calendar; Books, Conference Proceedings, etc.; Compendia, tools, etc.; Compiled booklist on OP-SF; Meeting Reports; Projects; Problems; Personal, Obituaries, etc.; History; Positions available; Miscellaneous; Memberlist; Preprint Servers and Links to WWW pages of interest to members. This is a convenient point of entry to all the services provided by the Group. Our Webmaster is Bonita Saunders (`bonita.saunders@nist.gov`).

The *Newsletter* is a publication of the Activity Group. It appears three times a year and is mailed by SIAM. Back issues are accessible at:

`http://www.mathematik.uni-kassel.de/~koepf/siam.html`

and

`ftp://euler.us.es/pub/newsletter`

To receive the *Newsletter*, you must be a member of SIAM and of the Activity Group. SIAM has several categories of membership, including low-cost categories for students and residents of developing countries. For current information on SIAM and Activity Group membership, contact:

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

The Activity Group also sponsors an electronic news net, called the OP-SF Net, which is transmitted periodically by SIAM. It is provided as a free public service; membership in SIAM is not required. The OP-SF Net Editor is Martin Muldoon (`muldoon@yorku.ca`). The Net provides fast turnaround compared to the *Newsletter*. To receive the Net, send your name and email address to `poly-request@siam.org`. To contribute a news item to the Net, send email to `poly@siam.org` with a copy to the OP-SF Net Editor. Please note that submissions to the Net are automatically considered for the *Newsletter*, and vice versa, unless the contributor requests otherwise. Back issues can be obtained at the WWW addresses:

`http://turing.wins.uva.nl/~hk/opsfnet`

`http://www.math.ohio-state.edu/JAT`

`http://math.nist.gov/opsfnet/archive`

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

subscribe opsftalk Your Name

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

`http://math.nist.gov/opsftalk/archive`

How to Contribute to the Newsletter

Send your Newsletter contributions directly to one of the Co-editors:

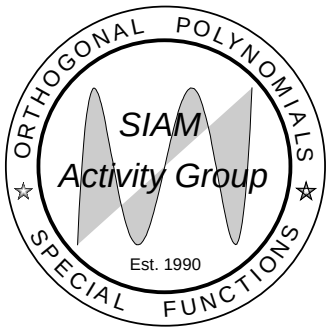
Renato Álvarez-Nodarse
Departamento de Análisis Matemático
Universidad de Sevilla
Apdo 1160, E-41080 Sevilla, Spain
phone: +34-954-55-79-97
fax: +34-95-455-79-72
e-mail: `ran@cica.es`

or

Rafael J. Yáñez
Departamento de Matematica Aplicada
Universidad de Granada
E-18071 Granada, Spain
phone: +34-958-249947
fax: +34-958-242862
e-mail: `ryanez@ugr.es`

preferably by e-mail, and in LaTeX format. Other formats are also acceptable and can be submitted by e-mail, regular mail or fax.

Deadline for submissions to be included in the October issue 2000 is September 15, 2000.



Activity Group: Addresses

Address corrections: Current Group members should send their address corrections to Marta Lafferty (lafferty@siam.org). Please feel free to contact any of the Activity Group Officers. Their addresses are:

Daniel W. Lozier ___ *Chair of the Activity Group*
National Institute of Standards and Technology
100 Bureau Drive
Gaithersburg, MD 20899-8910 USA
phone: (301) 975-2706 fax: (301) 990-4127
e-mail: dlozier@nist.gov
WWW: http://math.nist.gov/~DLozier

Walter Van Assche _____ *Vice Chair*
Department of Mathematics
Katholieke Universiteit Leuven
Celestijnenlaan 200B
B-3001 Leuven
Belgium
phone: +32-16-327051 fax: +32-16-327998
e-mail: walter@wis.kuleuven.ac.be
WWW: http://www.wis.kuleuven.ac.be/applied/walter.html

Francisco Marcellán _____ *Program Director*
Departamento de Matematicas
Escuela Politécnica Superior
Universidad Carlos III, Ave. de la Universidad
Edificio Sabatini, E-28911
Leganés, Madrid, Spain
phone: +34-91-624-94-42 fax: +34-91-624-91-51
e-mail: pacomarc@ing.uc3m.es

Charles Dunkl _____ *Secretary*
Department of Mathematics
University of Virginia, Charlottesville, VA 22903
phone: +1-804-924-4939 fax: +1-804-982-3084
e-mail: cfd5z@virginia.edu
WWW: http://www.math.virginia.edu/~cfd5z/home.html

Renato Álvarez-Nodarse . *Editor of the Newsletter*
Departamento de Análisis Matemático
Universidad de Sevilla, Apdo. 1160, E-41080
Sevilla, Spain
phone: +34-95-455-79-97 fax: +34-95-455-79-72
e-mail: ran@cica.es
WWW: http://merlin.us.es/~renato/

Rafael J. Yáñez _____ *Editor of the Newsletter*
Departamento de Matemática Aplicada
Universidad de Granada
E-18071 Granada, Spain
phone: +34-58-249947 fax: +34-58-242862
e-mail: ryanez@ugr.es
WWW: http://gandalf.ugr.es/~ryanez

Martin E. Muldoon ____ *Editor of the OP-SF Net*
Department of Mathematics & Statistics
York University
Toronto, Ontario M3J 1P3, Canada
phone: +1-416-736-5250 fax: +1-416-736-5757
e-mail: muldoon@yorku.ca
WWW: http://www.math.yorku.ca/~muldoon/

Bonita Saunders _____ *Webmaster*
National Institute of Standards and Technology
100 Bureau Drive
Gaithersburg, MD 20899-8910 USA
phone: (301) 975-3836 fax: (301) 990-4127
e-mail: bonita.saunders@nist.gov
WWW: http://math.nist.gov/~BSaunders