Orthogonal Polynomials and Special Functions

SIAM Activity Group on Orthogonal Polynomials and Special Functions

★ ★ ★ ★ **Newsletter** ★ ★ ★ ★

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From the Editors

This is the first issue of the Newsletter for this new millenium. Notice that there are lots of preprints related to Orthogonal Polynomials and Special Functions. As usual a lot of material comes from the OP-SF Net. We hope you enjoy this issue and remind you that you can contribute by sending your own items to one of the editors.

February 1, 2001

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Obituary for Ian Sneddon

Professor Ian Sneddon, OBE, FRS, FRSE, (1919-2000)

Ian Naismith Sneddon, formerly Simson Professor of Mathematics in the University of Glasgow, died suddenly on 4 November 2000, aged 80.

Ian Sneddon was born in Glasgow and gained a First Class honours degree in Mathematics and Natural Philosophy at the University of Glasgow in 1940. He then headed off to Cambridge and did Part II of the Tripos. However, the normal progression was interrupted because of the Second World War and he went to the Armaments Research and Development Establishment at Fort Halstead. There he met the eminent physicist Nevill (later Sir Nevill) Mott and their collaboration continued after the War, leading to the publication of a book on Wave Mechanics. By that time, Ian had returned to Glasgow to take

up a lectureship in Natural Philosophy. He was awarded a DSc in 1948.

His interests were gradually moving from theoretical physics to classical applied mathematics. In 1950, aged just 30, he was appointed the first Professor of Mathematics at what was later to become the University of Keele. However, Ian's heart was always in Glasgow and in 1956 he was appointed to the new Simson Chair of Mathematics (named after the geometer Robert Simson who is commemorated by the Simson Line of a triangle). From then until the end of his days, Ian served the University of Glasgow with great distinction, continuing as an Honorary Senior Research Fellow after his official retirement in 1985.

Ian published many papers, covering topics ranging from elasticity through ODEs and PDEs to applications of mathematics in biology and medicine. However, it is perhaps through his textbooks that he is known to the widest audience. In 1951 there appeared a large treatise on Fourier Transforms, followed a few years later by one on Partial Differential Equations. Special Functions were an enduring interest and Ian contributed a volume on this topic to a series of undergraduate texts produced by the Edinburgh firm of Oliver and Boyd, a series which was well known to undergraduates of the 60s such as the present writer.

Later he wrote *The Use of Integral Transforms* (McGraw-Hill, 1972). The front cover of my copy manages to get Ian's middle initial wrong but otherwise it is a splendid book. The preface says that the book was based on lectures to postgraduate students of Applied Mathematics, Physics and Engineering given at various times in the University of Glasgow, North Carolina State University and the State University of New York at Stony Brook. This vividly illustrates the point that Ian was by then what the airlines would now call a frequent flyer or a world traveller. A famous quote summed it up thus: "If you stand at any crossroads in any American city and wait long enough, Ian Sneddon will pass by"!

On one trip to Canada, he did some work with my own thesis supervisor, Arthur Erdélyi, which is close to my heart. They showed how the Erdélyi-Kober operators of Fractional Calculus could be used to study systematically Dual Integral Equations of Titchmarsh type such as arise from problems in potential theory. Previously, various authors had treated special cases in an ad hoc manner. Erdélyi and Sneddon produced a unified and elegant theory. This and other applications of Fractional Calculus are discussed in Sneddon's wide-ranging survey article in the Proceedings of the 1974 New Haven conference on Fractional Calculus, edited by Bertram Ross (*Lecture Notes in Mathematics*, Vol **457**, Springer, 1975) as well as in his book on *Mixed Boundary-Value Problems in Potential Theory* (North-Holland, 1966).

Apart from his transatlantic journeys, Ian had a strong affinity with Poland. One vehicle for this was classical music, a lifelong passion. He counted several composers among his close friends, notably Witold Lutoslawski. In recognition of his work in

fostering mathematical and cultural ties between Poland and Scotland, he was made a Commander, the Order of Polonia Restituta.

This was only one of many honours that Ian gained. He was elected a Fellow of the Royal Society of Edinburgh in 1958 and a Fellow of the Royal Society (of London) in 1983. He was made an Officer of the Order of the British Empire (OBE) in 1969.

On the occasion of his 70th birthday a special volume on the mathematical methods and applications of elasticity was produced, (edited by George Eason and Ray Ogden, Ellis Horwood, 1990). In December 1999, for his 80th birthday, another special conference was held. Ian showed more stamina than some of younger members of the audience in sitting through seven high-powered lectures and still leaving enough in reserve for the dinner in the evening.

Ian liked good food, good company and good conversation. He had an almost endless supply of anecdotes and stories to which he would regale his friends, whether at home, at work or at lunchtimes in the Glasgow Art Club. All of us who had the pleasure of knowing Ian have our own memories, one of which must surely be his beautiful handwriting. Many have cause to be grateful to Ian for advice and encouragement at various stages of their careers. The world of Mathematics will be a poorer place without him.

Adam McBride
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Forthcoming Meetings and Conferences

1. Program "Symmetric functions and Macdonald polynomials". Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, January to June 2001

The Isaac Newton Institute for Mathematical Sciences, Cambridge, UK will host a program "Symmetric functions and Macdonald polynomials" during January-June 2001.

Organisers: Professor P. Hanlon, Professor I.G. Macdonald and Professor A.O. Morris.

The overall programme: In the 1980s, I.G. Macdonald formulated a series of conjectures which predicted the constant terms of expressions that involve an important new class of symmetric functions called the Macdonald polynomials. Since their introduction, these conjectures and polynomials have been a central topic of study in Algebraic Combinatorics. Of particular note has been the variety of approaches used in efforts to solve the conjectures or to find an algebraic or geometric interpretation for the Macdonald polynomials themselves. Different approaches involve double affine Hecke algebras, homology of nilpotent Lie algebras, generalized traces of Lie algebra representations and diagonal actions of the symmetric group on polynomial rings in two sets of variables. In this programme we will attempt to unify these different approaches to the Macdonald polynomials and some of the outstanding conjectures that have resulted from this work. Links with other areas such as algebraic geometry, Lie algebras, non-commutative algebra, mathematical physics and mathematical statistics will be emphasised.

Inside this programme will be three Workshops (see the following two items in this issue):

- EuroWorkshop: Conjectures, Recent Results and Open Problems Related to the Macdonald Polynomials (8 - 12 January 2001),
- Applications of the Macdonald Polynomials (17 - 20 April 2001)
- NATO ASI - Symmetric Functions 2001: Surveys of Developments and Perspectives

Further information can be obtained in

`http://www.newton.cam.ac.uk/programs/sfm.html`

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2. NATO Advanced Study Institute. Symmetric Functions 2001: Surveys of Developments and Perspectives. Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, June 25 - July 6, 2001.

This NATO Advanced Study Institute is a part of the Isaac Newton Institute for Mathematical Sciences' Program "Symmetric functions and Macdonald polynomials" (see the previous two item in this issue)

Topics: Macdonald polynomials. Combinatorial and asymptotic problems in representation theory, algebraic geometry, and mathematical physics.

International Organizing Committee:

- Sergey Fomin, University of Michigan, U.S.A. (Director from a NATO country)
- Grigori Olshanski, Dobrushin Lab, IPPI, Russia (Director from a Partner country)
- Phil Hanlon, University of Michigan, U.S.A.
- Ian G. Macdonald, QMW, University of London, U.K.
- Andrei Okounkov, University of California at Berkeley, U.S.A.

Lecturers:

- Ivan Cherednik, University of North Carolina, U.S.A.
- Persi Diaconis, Stanford University, U.S.A.
- William Fulton, University of Michigan, U.S.A.
- Mark Haiman, University of California at San Diego, U.S.A.
- Phil Hanlon, University of Michigan, U.S.A.
- Alexander Klyachko, Bilkent University, Turkey
- Bernard Leclerc, Université de Caen, France
- Ian G. Macdonald, QMW, University of London, U.K.
- Masatoshi Noumi, Kobe University, Japan
- Andrei Okounkov, University at California at Berkeley, U.S.A.
- Grigori Olshanski, Dobrushin Lab, IPPI, Russia
- Eric Opdam, Korteweg-de Vries Institute, The Netherlands
- Anatoly Vershik, Steklov Institute, St.Petersburg Branch, Russia
- Andrei Zelevinsky, Northeastern University, U.S.A.

The SF-2001 web page

`http://www.math.lsa.umich.edu/~fomin/SF2001/`

at the Newton Institute has application/registration forms, information on financial support, lodging, and travel. This ASI is planned as the concluding event of the Scientific Programme on Symmetric Functions and Macdonald Polynomials at the Newton Institute.

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3. Sixth International Symposium on Orthogonal Polynomials, Special Functions and Applications, Rome (Italy), June 18-22, 2001.

WWW: `http://www.mat.uniroma3.it/opsfa2001`

Second Announcement

Dear colleagues,

The Department of Mathematics of the University of Roma Tre and the Department of Mathematics "Guido Castelnuovo" of the University of Roma "La Sapienza" are delighted to organize the Sixth international Symposium on Orthogonal Polynomials, Special Functions and their applications (OPSFA), which will be held for the first time in Roma on June 18–22, 2001. Since we received many preregistration forms, we expect about 200 scientists from all over the world. The Symposium is partially granted by C.N.R.–G.N.I.M. (National Research Council - National Group for Mathematical Informatics).

As we wrote in the old web page, the Symposium will take place in a great hotel situated at Lido di Ostia, which is a seaside resort on the outskirts of Roma; all participants will be lodged in the same hotel, and will be provided with complimentary (or free) transportation from and to the International Airport "Leonardo da Vinci" of Fiumicino (which is a few km away) by the hotel's bus. Also, it is easy to reach the centre of Roma from the Symposium site, since a new train station (Lido di Ostia Nord) was opened near the hotel just a few months ago. Anyway, participants who do not want to go to Roma may also find a very pleasant environment in Ostia.

Scope, topics and program

The 6th OPSFA follows the European Conferences of Bar-Le-Duc (France, 1984), Segovia (Spain, 1986), Erice (Italy, 1990), Granada (Spain, 1991, VII SPOA), Evian (France, 1992), Delft (Holland, 1994, in honour of Thomas Jan Stieltjes Jr. (1856-1894)), Sevilla (Spain, 1997, VIII SPOA) and Patra (Greece, 1999, in honour of Theodore Chihara). It covers the field of orthogonal polynomials and special functions and their applications in the other areas of mathematics, physics and other sciences. This Symposium is a forum for presentation and discussion of all aspects of orthogonal polynomials and special functions, ranging from the fundamental to the applied.

The **aim** of the Symposium is to provide a common meeting ground for specialists in orthogonal polynomials, special functions and related topics, such as moment problems, rational approximation, matrix orthogonal polynomials, Sobolev orthogonal polynomials as well as in the rich variety of scientific applications of these objects.

The scientific program includes plenary lectures and research seminars. An approximate timetable will be given

in the third circular, which will be sent to all those who register for the Symposium. The final program will be distributed at the registration desk on June 17 (Sunday).

Invited Speakers :

- R. Askey (University of Wisconsin - USA)
- C. Dunkl (University of Virginia - USA)
- À. Elbert (Academy of Sciences Budapest - Hungary)
- D. Sattinger (University of Utah - USA)
- D. Stanton (University of Minnesota - USA)
- S. K. Suslov (Arizona State University - USA)
- N. Temme (C.W.I. - Netherlands)
- W. Van Assche (K.U. Leuven - Belgium)

Scientific Committee:

- A. Laforgia (Universitá Roma Tre, Italy)
- P. E. Ricci (Universitá "La Sapienza", Roma, Italy)
- M. De Bruin (University of Delft, Netherlands)
- F. Marcellán (Universidad Carlos III, Madrid, Spain)
- P. D. Siafarikas (University of Patras, Greece)
- M. Muldoon (York University, Canada)
- R. Wong (City University of Hong Kong, China)

Scientific Program and Publications

The scientific program is currently being elaborated by the scientific committee. It will consist, as usual, of some plenary lectures and short communications (20 minutes). All participants are invited to submit a 20-minute research seminar; please send us a short abstract (not more than 15 - 20 lines) of your talk in TEX or LATEX format **not later than March 31, 2001**. The book of abstracts will be distributed to the participants upon registration at the Symposium desk. The proceedings of the Symposium will be published on an important international mathematics journal (more details will be given in the third circular).

Registration Fees

Please complete the registration form at the web site

`http://web2.mat.uniroma3.it/opsfa2001/`

and return it before February 15, 2001 via Internet. You may also send it via air mail to the Symposium mailing address:

Sixth International Symposium on Orthogonal Polynomials, Special
Functions and their Application
Dipartimento di Matematica Universitá Roma Tre
Largo S. Leonardo Murialdo, 1
00146 ROMA (Italy)

Tel. +39 65 488 8025, +39 65 488 8008; Fax +39 65 488 8072.

In case of difficulty email us at the address

`opsfa2001@mat.uniroma3.it`

The following fees are applicable for the Symposium:

Participants: Euro 280.00

Students (under formal verification): Euro 120.00

After February 15, all participants and students (not accompanying persons) must pay an additional fee of Euro 60.00 for late registration.

Accompanying persons: Euro: 120.00

Participant's and student's fee includes: transportation from the airport "Leonardo da Vinci" to the hotel and vice versa; admission to the Symposium; Symposium documents; book of abstracts; Symposium Proceedings; official reception/welcome drink; lunch in the hotel from Tuesday to Friday; guided visit to Roma's surroundings; other social events being studied.

Accompanying person's fee includes: transportation from the airport "Leonardo da Vinci" to the hotel and vice versa; official reception/welcome drink; guided visit to Roma's surroundings; other social events being studied.

Cancellation must be made in writing to the Organizing Committee. The following rules will apply: cancellation received before April 15, 2001: 80% refund; cancellation received before May 25, 2001: 50% refund; cancellation received from May 25, 2001 on: no refund.

Accommodation

All the participants will be lodged at the hotel SATELLITE PALACE - Via delle Antille, 19 - 00121 Roma (Italy). The prices that we have arranged for the Symposium are:

single room: 180,000 lire (Euro 92.96) per day

double room: 240,000 lire (Euro 123.95) per day

triple room: 330,000 lire (Euro 170.43) per day.

The registration fee of participants and students will include lunch (from Monday 18 to Friday 22) and the Conference banquet. Participants are asked to contact the hotel directly in order to book rooms:

Tel.: +39 65 6183, Fax: +39 65 695 993 or +39 65 692 341

E-mail: `satellitepalace@tin.it`

In special cases, the Organizing Committee will send

a personal invitation for participation in the Symposium. It should be understood that such an invitation is not a commitment on the part of the organizers to provide any financial support.

Deadlines

Registration must be received before February 15, 2001. After sending the form, please pay your registration fee as soon as possible. Abstracts of plenary lectures and of research seminars must be received before March 31, 2001.

You may also use the e-mail address of the Symposium `opsfa2001@mat.uniroma3.it` or the e-mail addresses of the members of the local organizing committee:

- Andrea Laforgia: `laforgia@mat.uniroma3.it`
- Paolo Emilio Ricci: `riccip@.uniroma1.it`
- Pierpaolo Natalini: `natalini@mat.uniroma3.it`
- Fabrizio Pascucci: `poggi@uniroma3.it`
- Biagio Palumbo: `palumbo@mat.uniroma3.it`

Further Communications

The third (and last) circular will be sent in May only to those who send the registration form. You are requested to register as soon as possible. If you need further information please write an e-mail message to the Secretary of the Symposium, at the address `opsfa2001@mat.uniroma3.it` or contact one of us directly (see e-mail addresses above).

Looking forward to seeing you in Roma

Organizing Committee
(`opsfa2001@mat.uniroma3.it`)

4. 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/`

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5. 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. The 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
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6. First 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 Dr. William B. Jones Professor Emeritus University of Colorado, Boulder, USA

In recognition of the contributions Professor William B. Jones has made to the field of continued fractions and rational approximation, we are pleased to announce a conference organized in his honor. The conference will be held August 6-10, 2001, at Mesa State College in Grand Junction, Colorado, USA. We invite contributions from both the theoretical and computational aspects of continued fractions, orthogonal polynomials, rational approximation, and related areas and applications.

There is no need to commit to attending the conference at this time. However, if you are interested in receiving a second announcement and would like to be on our mailing list, please respond or email to one of the organizers at the address below, including your name, mailing address and email address.

More information about Mesa State College and Grand Junction, Colorado, can be found at `http://www.mesastate.edu`, and `http://www2.mesastate.edu/community_links.htm`.

We hope to see you there.

Organizers:
Cathy Bonan-Hamada, Phil Gustafson
Mathematics Department
Mesa State College
1100 North Ave.
Grand Junction, CO
81501-3122 USA

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

7. 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`)

8. 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)

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. 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: approxima-

tions 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. The Proceedings of the "International Workshop on Special Functions - Asymptotics, Harmonic Analysis and Mathematical Physics", C. Dunkl, M. Ismail, R. Wong, editors,
World Scientific, 2000
438+xi pp Publication Year 2000
ISBN 981-02-4393-6 US $ 80

The Proceedings of the "International Workshop on Special Functions - Asymptotics, Harmonic Analysis and Mathematical Physics" held June 21-25, 1999 at the City University of Hong Kong have been published by World Scientific at a price of US $80.

City University has, on behalf of the conference organizing committee, purchased copies which are being made available to the participants at a reduced price of US $20. A limited number of additional copies is available to others at this price on a first-come first-served basis. Those wishing to take advantage of this offer should send a check for US $20, made payable to "City University of Hong Kong". The address is as follows:

Colette Lam IWSF'99 Workshop Secretary
Liu Bie Ju Center for Mathematical Sciences
City University of Hong Kong
83 Tat Chee Avenue
Kowloon, Hong Kong

The table of contents of the IWSF'99 Proceedings is printed below. There was a panel discussion at the Workshop, for which a summary was written. This summary is mentioned in the preface to the Proceedings but was omitted inadvertently. It can be seen at http://math.nist.gov/opsf/books/hongkong99.html.

It appeared also in this Newsletter (vol. 10, no. 1, October 1999) and OPSF-NET (vol. 6, no. 5, September 1999). For further information about the Workshop, including photographs, see http://www.cityu.edu.hk/ma/conference/iwsf/index.html.

Contents:

1. Integral Representations of Quasi Hypergeometric Functions by K. Aomoto
2. Combinatorics of Crystals for Tensor and Spinor Representations of $U_q(B_n)$ by T. H. Baker
3. On Infinitely Divisible Solutions to Indeterminate Moment Problems by C. Berg
4. Generating Orthogonal Polynomials for Exponential Weights on a Finite Interval by R. C. Y. Chin and D. Ridzal
5. Spherical Multipliers and Spherical Multiplier Transformations by H. Ding
6. Generating Functions Associated with Dihedral Groups by C. F. Dunkl
7. Existence of Approximate Identities in Maximal Ideals of Hypergroup-Algebras by F. Filbir
8. Zeros of Jacobi Polynomials with Varying Non-Classical Parameters by A. Martínez-Finkelshtein, P. Martínez-González and R. Orive
9. Asymptotic Behavior of Eigenfunctions for the Hecke Algebra on Homogeneous Trees by P. Gérardin and K. F. Lai
10. Some Relations for Partitions into Four Squares by M. D. Hirschhorn and J. A. Sellers
11. Algebraic Aspects of Quantum Calogero Models by S. Kakei and Y. Kato
12. Special Functions and Perturbations of Black Holes by E. G. Kalnins, W. Miller Jr., G. F. Torres Del Castillo and G. C. Williams
13. On a Nonlinear Recurrence Related to Nevai Polynomials by D. Kaminski
14. Inversion Formulas Involving Orthogonal Polynomials and Some of Their Applications by R. Koekoek
15. Bochner-Krall Orthogonal Polynomials by K. H. Kwon, G. J. Yoon and L. L. Littlejohn

16. Orthogonal Expansions for L_p- and C-Spaces by R. Lasser and J. Obermaier

17. The DLMF Project: A New Initiative in Classical Special Functions by D. W. Lozier

18. Resurgence in Difference Equations, with an Application to Legendre Functions by F. W. J. Olver

19. On Exorcising Secular Terms by R. E. O'Malley Jr.

20. New Asymptotic Formulas for the Riemann Zeta Function on the Critical Line by R. B. Paris

21. A $q-$Analogue of a Product Formula of Bailey and Related Results by M. Rahman

22. The Brahmagupta Matrix and its Applications to Tiling by R. Rangarajan and E. R. Suryanarayan

23. Elliptic Integrals of the First and Second Kind - Comparison of Bulirsch's and Carlson's Algorithms for Numerical Calculation by K.-D. Reinsch and W. Raab

24. Short-Time Estimates for Heat Kernels Associated with Root Systems by M. Rösler

25. Solitons and Coulomb Plasmas, Similarity Reductions and Special Funtions by V. P. Spiridonov

26. The Role of Hermite Polynomials in Asymptotic Analysis by N. M. Temme and J. L. López

27. Statistics of Graph Spectra for Some Finite Matrix Groups: Finite Quantum Chaos by A. Terras

28. Convolution Semigroups and Calderón's Formula for Compact K-Variable Continuous Polynomial Hypergroups by K. Trimèche

29. Rodrigues Formulas for Nonsymmeyric Multivariable Polynomials Associated with Quantum Integrable Systems of Calogero-Sutherland Type by H. Ujino and A. Nishino

30. Orthogonal Polynomials and Their Asymptotic Behavior by R. Wong

31. A Product Formula for Jacobi Polynomials by Y. Xu

32. Schur Functions and Two Realizations of the Basic $A_1(1)$-Module by H.-F. Yamada

Martin Muldoon
(muldoon@yorku.ca)

2. Fourier Series in Orthogonal Polynomials
by Boris Osilenker (Moscow State Civil Engineering University)
World Scientific, 1999
296pp Pub. date: Apr 1999
ISBN 981-02-3787-1 US $55 £34

This information is taken from the the web site:

http://www.wspc.com.sg/books/mathematics/4039.htm

This book presents a systematic course on general orthogonal polynomials and Fourier series in orthogonal polynomials. It consists of six chapters. Chapter 1 deals in essence with standard results from the university course on the function theory of a real variable and on functional analysis. Chapter 2 contains the classical results about the orthogonal polynomials (some properties, classical Jacobi polynomials and the criteria of boundedness).

The main subject of the book is Fourier series in general orthogonal polynomials. Chapters 3 and 4 are devoted to some results in this topic (classical results about convergence and summability of Fourier series in L2m; summability almost everywhere by the Cesaro means and the Poisson-Abel method for Fourier polynomial series are the subject of Chapters 4 and 5).

The last chapter contains some estimates regarding the generalized shift operator and the generalized product formula, associated with general orthogonal polynomials.

The starting point of the technique in Chapters 4 and 5 is the representations of bilinear and trilinear forms obtained by the author. The results obtained in these two chapters are new ones.

Chapters 2 and 3 (and part of Chapter 1) will be useful to postgraduate students, and one can choose them for treatment.

This book is intended for researchers (mathematicians, mechanicians and physicists) whose work involves function theory, functional analysis, harmonic analysis and approximation theory.

Contents:

1. Orthogonal Polynomials and Their Properties
2. Convergence and Summability of Fourier Series in L^2_μ
3. Fourier Orthogonal Series in L^r_μ $(1 < r < \infty)$ and C
4. Fourier Polynomial Series in L^1_μ. Analogs of Fatou Theorems
5. The Representations of the Trilinear Kernels. Generalized Translation Operator in Orthogonal Polynomials

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

3. Elliptic Polynomials
by J.S. Lomont, University of Arizona, USA and John Brillhart University of Arizona, USA
Chapman & Hall/CRC
320pp Pub. date: Aug 2000
ISBN/ISSN: 1584882107 US $84.95

This information is taken from the the web site:

`http://www.crcpress.com`

Description: A remarkable interplay exists between the fields of elliptic functions and orthogonal polynomials. In the first monograph to explore their connections, elliptic polynomials combines these two areas of study, leading to an interesting development of some basic aspects of each. It presents new material about various classes of polynomials and about the odd Jacobi elliptic functions and their inverses. The term elliptic polynomials refers to the polynomials generated by odd elliptic integrals and elliptic functions. In studying these, the authors consider such things as orthogonality and the construction of weight functions and measures, finding structure constants and interesting inequalities, and deriving useful formulas and evaluations. Although some of the material may be familiar, it establishes a new mathematical field that intersects with classical subjects at many points. Its wealth of information on important properties of polynomials and clear, accessible presentation make elliptic polynomials valuable to those in real and complex analysis, number theory, and combinatorics, and will undoubtedly generate further research.

Martin Muldoon
(`muldoon@yorku.ca`)

4. Fourier Analysis by Javier Duoandikoetxea, Universidad del País Vasco/Euskal Herriko Unibertsitatea, Bilbao, Spain
American Mathematical Society
Series: Graduate Studies in Mathematics Vol. 29
222pp, Publication Year 2001
ISBN: 0-8218-2172-5, US $35

This information is taken from the AMS web site:

`http://www.ams.org`

Description: Fourier analysis encompasses a variety of perspectives and techniques. This volume presents the real variable methods of Fourier analysis introduced by Calderón and Zygmund. The text was born from a graduate course taught at the Universidad Autónoma de Madrid and incorporates lecture notes from a course taught by José Luis Rubio de Francia at the same university.

Motivated by the study of Fourier series and integrals, classical topics are introduced, such as the Hardy-Littlewood maximal function and the Hilbert transform. The remaining portions of the text are devoted to the study of singular integral operators and multipliers. Both classical aspects of the theory and more recent developments, such as weighted inequalities, H^1, BMO spaces, and the $T1$ theorem, are discussed.

Chapter 1 presents a review of Fourier series and integrals; Chapters 2 and 3 introduce two operators that are basic to the field: the Hardy-Littlewood maximal function and the Hilbert transform. Chapters 4 and 5 discuss singular integrals, including modern generalizations. Chapter 6 studies the relationship between H^1, BMO, and singular integrals; Chapter 7 presents the elementary theory of weighted norm inequalities. Chapter 8 discusses Littlewood-Paley theory, which had developments that resulted in a number of applications. The final chapter concludes with an important result, the T1 theorem, which has been of crucial importance in the field.

This volume has been updated and translated from the Spanish edition that was published in 1995. Minor changes have been made to the core of the book; however, the sections, "Notes and Further Results" have been considerably expanded and incorporate new topics, results, and references. It is geared toward graduate students seeking a concise introduction to the main aspects of the classical theory of singular operators and multipliers. Prerequisites include basic knowledge in Lebesgue integrals and functional analysis.

Contents:

1. Fourier series and integrals
2. The Hardy-Littlewood maximal function
3. The Hilbert transform
4. Singular integrals (I)
5. Singular integrals (II)
6. H^1 and BMO
7. Weighted inequalities
8. Littlewood-Paley theory and multipliers
9. The $T1$ theorem
10. Bibliography
11. Index

Martin Muldoon
(`muldoon@yorku.ca`)

5. Orthogonal Polynomials and Random Matrices: A Riemann-Hilbert Approach
by Percy Deift, New York University-Courant Institute of Mathematical Sciences
American Mathematical Society
Series: Courant Lecture Notes Vol. 3
261pp, Publication Year: 2000
ISBN: 0-8218-2695-6 US $31

This information is taken from the AMS the web site:

`http://www.ams.org`

Description: This volume expands on a set of lectures held at the Courant Institute on Riemann-Hilbert problems, orthogonal polynomials, and random matrix theory. The goal of the course was to prove universality for a variety of statistical quantities arising in the theory of random matrix models. The central question was the following: Why do very general ensembles of random n times n matrices exhibit universal behavior as $n \to \infty$? The main ingredient in the proof is the steepest descent method for oscillatory Riemann-Hilbert problems.

Titles in this series are copublished with the Courant Institute of Mathematical Sciences at New York University.

Contents:

1. Riemann-Hilbert problems
2. Jacobi operators
3. Orthogonal polynomials
4. Continued fractions
5. Random matrix theory
6. Equilibrium measures
7. Asymptotics for orthogonal polynomials
8. Universality
9. Bibliography

Martin Muldoon
(`muldoon@yorku.ca`)

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/0011002

   Title: *Transmutation kernels for the little q-Jacobi function transform*

   Author: Erik Koelink, Hjalmar Rosengren

   Categories: CA Classical Analysis (QA Quantum Algebra)

   Math Subject Class: 33D15, 33D45, 47B36

   Comments: 24 pages, AMS-TeX

   From: T. H. Koelink, `koelink@twi.tudelft.nl`

   Abstract: The little $q-$Jacobi function transform depends on three parameters. An explicit expression as a sum of two very-well-poised ${}_8W_7$-series is derived for the dual transmutation kernel (a kind of non-symmetric Poisson kernel) relating little $q-$Jacobi function transforms for different parameter sets. A product formula for the dual transmutation kernel is obtained. For the inverse transform the transmutation kernel is given as a ${}_3\phi_2-$series, and a product formula as a finite sum is derived. The transmutation kernel gives rise to intertwining operators for the second order hypergeometric $q-$difference operator, which generalise the intertwining operators arising from a Darboux factorisation.

2. math.CA/0010162

   Title: *A new A_n extension of Ramanujan's 1-psi-1 summation with applications to multilateral A_n series*

   Authors: S. C. Milne (The Ohio State University), M. Schlosser (The Ohio State University)

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

   Math Subject Class: 33D15 (Primary) 05A19, 33D67 (Secondary)

   Comments: LaTeX2e, 26 pages, submitted to Rocky Mount. J. Math., spec. vol., conference proceedings of SF2000, Tempe, Arizona, May 29 - June 9, 2000

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

   Abstract: In this article, we derive some identities for multilateral basic hypergeometric series associated to the root system A_n. First, we apply Ismail's argument to an A_n $q-$binomial theorem of Milne and derive a new A_n generalization of Ramanujan's ${}_1\psi_1$ summation theorem. From this new A_n ${}_1\psi_1$ summation and from an A_n ${}_1\psi_1$ summation of Gustafson we deduce two lemmas for deriving simple A_n generalizations of bilateral basic hypergeometric series identities. These lemmas are closely related to the Mac-

donald identities for A_n. As samples for possible applications of these lemmas, we provide several A_n extensions of Bailey's ${}_2\psi_2$ transformations, and several A_n extensions of a particular ${}_2\psi_2$ summation.

3. math.CA/0010161

   Title: *Elementary derivations of identities for bilateral basic hypergeometric series*

   Author: M. Schlosser (The Ohio State University)

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

   Math Subject Class: 33D15

   Comments: LaTeX2e, 35 pages, revised abstract and introduction

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

   Abstract: We give elementary derivations of several classical and some new summation and transformation formulae for bilateral basic hypergeometric series. For purpose of motivation, we review our previous simple proof ("A simple proof of Bailey's very-well-poised ${}_6\psi_6$ summation", *Proc. Amer. Math. Soc.*, to appear) of Bailey's very-well-poised ${}_6\psi_6$ summation. Using a similar but different method, we now give elementary derivations of some transformations for bilateral basic hypergeometric series. In particular, these include M. Jackson's very-well-poised ${}_8\psi_8$ transformation, a very-well-poised ${}_{10}\psi_{10}$ transformation, by induction, Slater's general transformation for very-well-poised ${}_{2r}\psi_{2r}$ series, and Slater's transformation for general ${}_r\psi_r$ series. Finally, we derive some new transformations for bilateral basic hypergeometric series of Chu-Gasper-Karlsson-Minton-type.

4. math.CA/0005095

   Title: *A generalization of Kummer's identity*

   Author: Raimundas Vidunas

   Categories: CA Classical Analysis

   Math Subject Class: 33C05, 33F10, 39A10

   Comments: 13 pages; classical proofs simplified, possible transformations reviewed; in the algoritmic part similar evaluations of other series added

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

   Abstract: The well-known Kummer's formula evaluates the hypergeometric series ${}_2F_1(A,B;C;-1)$ when the relation $B-A+C=1$ holds. This paper deals with evaluation of ${}_2F_1(-1)$ series in the case when $C-A+B$ is an integer. Such a series is expressed as a sum of two $\Gamma-$terms multiplied by terminating ${}_3F_2(1)$ series. A few such formulas were essentially known to Whipple in 1920's. Here we give a simpler and more complete overview of this type of evaluations. Additionally, algorithmic aspects of evaluating hypergeometric series are considered. We illustrate Zeilberger's method and discuss its applicability to non-terminating series, and present a couple of similar generalizations of other known formulas.

5. math.CA/9909025

   Title: *A q-analogue of convolution on the line*

   Authors: G. Carnovale (Universita degli Studi di Roma, "Tor Vergata"), T. H. Koornwinder (Universiteit van Amsterdam)

   Categories: CA Classical Analysis (QA Quantum Algebra)

   Math Subject Class: 33D80, 33D15, 42A85 (primary), 17B37 (secondary) Report number: Report 99-12, Math. Preprint Series, Fac. WINS, Univ. of Amsterdam

   Comments: 31 pages; many small corrections; accepted by Methods and Applications of Analysis

   From: Tom H. Koornwinder, thk@wins.uva.nl

   Abstract: In this paper we study a q-analogue of the convolution product on the line in detail. A convolution product on the braided line was defined algebraically by Kempf and Majid. We adapt their definition in order to give an analytic definition for the $q-$convolution and we study convergence extensively. Since the braided line is commutative as an algebra, all results can be viewed both as results in classical $q-$analysis and in braided algebra. We define various classes of functions on which the convolution is well-defined and we show that they are algebras under the defined product. One particularly nice family of algebras, a decreasing chain depending on a parameter running through (0,1], turns out to have 1/2 as the critical parameter value above which the algebras are commutative. Morerover, the commutative algebras in this family are precisely the algebras in which each function is determined by its $q-$moments. We also treat the relationship between $q-$convolution and $q-$Fourier transform. Finally, in the Appendix, we show an equivalence between the existence of an analytic continuation of a function defined on a $q-$lattice, and the behaviour of its $q-$derivatives.

6. math.CA/0007046

   Title: *A simple proof of Bailey's very-well-poised ${}_6\psi_6$ summation*

   Author: M. Schlosser (The Ohio State University)

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

   Math Subject Class: 33D15

   Comments: LaTeX2e, 10 pages, submitted to Proc. AMS, revised version, proofs of ${}_1\psi_1$ and ${}_2H_2$ summations included

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

Abstract: We give elementary derivations of some classical summation formulae for bilateral (basic) hypergeometric series. In particular, we apply Gauss' ${}_2F_1$ summation and elementary series manipulations to give a simple proof of Dougall's ${}_2H_2$ summation. Similarly, we apply Rogers' nonterminating ${}_6\phi_5$ summation and elementary series manipulations to give a simple proof of Bailey's very-well-poised ${}_6\psi_6$ summation. Our method of proof extends M. Jackson's first elementary proof of Ramanujan's ${}_1\psi_1$ summation.

7. math-ph/0010003

   Title: *A deformation of Hermite polynomials*

   Author: M. Mekhfi

   Categories: MP Mathematical Physics (CA Classical Analysis; FA Functional Analysis)

   Math Subject Class: 33C45;34A35

   Comments: 16 pages, Latex

   From: M. Mekhfi, mekhfi@elbahia.cerist.dz

   Abstract: We propose and study the properties of a set of polynomials $M^s_{n\alpha,H}(z)$, $C^s_{n\alpha,H}(z)$ $W^s_{n\alpha,H}(z)$ with $n, s \in N$; $\alpha = \pm 1$; and where H stands for Hermite; the "root " polynomial. These polynomials are obtained from a deformation of Hermite polynomials $H_n(z)$. The structure underlying the deformation seems quite general and not only restricted to Hermite polynomials.

8. math.QA/0010093

   Title: *Harmonic analysis on the $SU(2)$ dynamical quantum group*

   Authors: Erik Koelink, Hjalmar Rosengren

   Categories: QA Quantum Algebra (CA Classical Analysis)

   Math Subject Class: 20G42, 33D45, 33D80

   Comments: 51 pages

   From: H. Rosengren, hjalmar@math.chalmers.se

   Abstract: Dynamical quantum groups were recently introduced by Etingof and Varchenko as an algebraic framework for studying the dynamical Yang-Baxter equation, which is precisely the Yang-Baxter equation satisfied by $6j-$symbols. We investigate one of the simplest examples, generalizing the standard $SU(2)$ quantum group. The matrix elements for its corepresentations are identified with Askey-Wilson polynomials, and the Haar measure with the Askey-Wilson measure. The discrete orthogonality of the matrix elements yield the orthogonality of $q-$Racah polynomials (or quantum $6j-$symbols). The Clebsch-Gordan coefficients for representations and corepresentations are also identified with $q-$Racah polynomials. This results in new algebraic proofs of the Biedenharn-Elliott identity satisfied by quantum $6j-$symbols.

9. math.QA/0010170

   Title: *q-Bessel-Macdonald functions*

   Author: V.-B. K. Rogov

   Categories: QA Quantum Algebra Report number: ITEP-TH-56/00

   Comments: 10 pages, Latex

   From: olshanet, olshanet@heron.itep.ru

   Abstract: The modified $q-$Bessel functions and the $q-$Bessel-Macdonald functions of the first and second kind are introduced. Their definition is based on representations as power series. Recurrence relations, the $q-$Wronskians, asymptotic decompositions and $q-$integral representations are received. In addition, the $q-$Bessel-Macdonald function of kind 3 is determined by its $q-$integral representation.

10. math.CO/0010279

    Title: *Generalized Umemura polynomials*

    Author: Anatol N. Kirillov, Makoto Taneda

    Categories: CO Combinatorics (QA Quantum Algebra)

    Math Subject Class: 14D15;34M55

    Comments: 10 pages

    From: A. N. Kirillov, kirillov@crm.umontreal.ca

    Abstract: We introduce and study generalized Umemura polynomials $U^{(k)}_{n,m}(z,w;a,b)$ which are a natural generalization of the Umemura polynomials $U_n(z,w;a,b)$ related to Painlevé VI equation. We will show that if $a=b$, or $a=0$, or $b=0$ then polynomials $U^{(0)}_{n,m}(z,w;a,b)$ generate solutions to Painlevé VI. We will describe a connection between polynomials $U^{(0)}_{n,m}(z,w;a,0)$ and certain Umemura polynomials $U_k(z,w;\alpha,\beta)$.

11. math.AG/0010246

    Title: *Hilbert schemes, polygraphs, and the Macdonald positivity conjecture*

    Author: Mark Haiman

    Categories: AG Algebraic Geometry (CO Combinatorics; QA Quantum Algebra)

    Math Subject Class: 14C05 (primary), 05E05, 13H10, 14F05, 14M05 (secondary)

    Comments: 56 pages. Submitted to Journal of the A.M.S. See also http://math.ucsd.edu/~mhaiman

From: Mark Haiman, mhaiman@macaulay.ucsd.edu

Abstract: We study the isospectral Hilbert scheme X_n, defined as the reduced fiber product of C^{2n} with the Hilbert scheme H_n of points in the plane, over the symmetric power S^nC^2. We prove that X_n is normal, Cohen-Macaulay, and Gorenstein, and hence flat over H_n. We derive two important consequences.

(1) We prove the strong form of the "$n!$ conjecture" of Garsia and the author, giving a representation-theoretic interpretation of the Kostka-Macdonald coefficients $K_{\lambda,\mu}(q,t)$. This establishes the Macdonald positivity conjecture, that $K_{\lambda,\mu}(q,t)$ is always a polynomial with non-negative integer coefficients.

(2) We show that the Hilbert scheme H_n is isomorphic to the Hilbert scheme of orbits C^{2n}/S_n, in such a way that X_n is identified with the universal family over C^{2n}/S_n.

12. math.CO/0009171

Title: *New Weighted Rogers-Ramanujan Partition Theorems and their Implications*

Author: Krishnaswami Alladi, Alexander Berkovich

Categories: CO Combinatorics (NT Number Theory)

Math Subject Class: 11P83, 11P81, 05A19

Comments: 31 pages, 4 figures

From: K. Alladi, alladi@math.ufl.edu

Abstract: This paper has a two-fold purpose. First, by considering a reformulation of a deep theorem of Göllnitz, we obtain a new weighted partition identity involving the Rogers-Ramanujan partitions, namely, partitions into parts differing by at least two. Consequences of this include Jacobi's celebrated triple product identity for theta functions, Sylvester's famous refinement of Euler's theorem, as well as certain weighted partition identities. Next, by studying partitions with prescribed bounds on successive ranks and replacing these with weighted Rogers-Ramanujan partitions, we obtain two new sets of theorems - a set of three theorems involving partitions into parts $\not\equiv 0, \pm i$ $(mod\ 6)$, and a set of three theorems involving partitions into parts $\not\equiv 0, \pm i$ $(mod\ 7)$, $i = 1, 2, 3$.

13. nlin.SI/0010048:

Title: *Darboux transforms on Band Matrices, Weights and associated Polynomials*

Authors: Mark Adler, Pierre van Moerbeke

Subj-class: Exactly Solvable and Integrable Systems

Abstract: Classically, it is well known that a single weight on a real interval leads to orthogonal polynomials. In "Generalized orthogonal polynomials, discrete KP and Riemann-Hilbert problems", *Comm. Math. Phys.* **207** (1999) 589-620, we have shown that $m-$periodic sequences of weights lead to "moments", polynomials defined by matrices containing these moments and $2m+1-$step relations between them, thus leading to $2m+1-$band matrices L. In this paper, we show the explicit effect of Darboux transformations on the $m-$periodic sequence, i.e., after the Darboux map on L, what is the new $m-$periodic sequence of weights, thus giving explicit formulae for the new polynomials.

14. nlin.SI/0009002:

Title: *Generalized orthogonal polynomials, discrete KP and Riemann-Hilbert problems*

Authors: Mark Adler, Pierre van Moerbeke

Comments: 40 pages

Subj-class: Exactly Solvable and Integrable Systems; Mathematical Physics; Classical Analysis

Journal-ref: Comm. Math. Phys., 207, 589–620 (1999)

Abstract: Classically, a single weight on an interval of the real line leads to moments, orthogonal polynomials and tridiagonal matrices. Appropriately deforming this weight with times $t = (t_1, t_2, ...)$, leads to the standard Toda lattice and tau-functions, expressed as Hermitian matrix integrals. This paper is concerned with a sequence of $t-$perturbed weights, rather than one single weight. This sequence leads to moments, polynomials and a (fuller) matrix evolving according to the discrete KP-hierarchy. The associated tau-functions have integral, as well as vertex operator representations. Among the examples considered, we mention: nested Calogero-Moser systems, concatenated solitons and $m-$periodic sequences of weights. The latter lead to $2m+1$-band matrices and generalized orthogonal polynomials, also arising in the context of a Riemann-Hilbert problem. We show the Riemann-Hilbert factorization is tantamount to the factorization of the moment matrix into the product of a lower-times upper-triangular matrix.

15. nlin.SI/0001001

Title: *Fermionic representation for basic hypergeometric functions related to Schur polynomials*

Authors: A.Yu.Orlov, D.M.Scherbin

Subj-class: Exactly Solvable and Integrable Systems

From: D. Scherbin,sdm@pool-7.ru

Abstract: We present the fermionic representation for the $q-$deformed hypergeometric functions related to Schur polynomials considered by S. Milne. For $q = 1$ these functions are also known as hypergeometric functions of matrix argument which are related to

zonal spherical polynomials for $GL(N,C)/U(N)$ symmetric space. We show that these multivariable hypergeometric functions are tau-functions of the KP hierarchy. At the same time they are the ratios of Toda lattice tau-functions considered by Takasaki evaluated at certain values of higher Toda lattice times. The variables of the hypergeometric functions are related to the higher times of those hierarchies via Miwa change of variables. The discrete Toda lattice variable shifts parameters of hypergeometric functions. Hypergeometric functions of type ${}_pF_s$ can be also viewed as group 2-cocycle for the ΨDO on the circle of the order $p-s \leq 1$ (the group times are higher times of TL hierarchy and the arguments of hypergeometric function). We get the determinant representation and the integral representation of special type of KP tau-functions, these results generalize some of Milne's results. We write down a system of linear differential and difference equations for these tau-functions (string equations). We present also fermionic representation for special type of Gelfand-Graev hypergeometric functions.

16. math.CA/0011002

Title: *Transmutation kernels for the little q-Jacobi function transform*

Author: Erik Koelink, Hjalmar Rosengren

Categories: CA Classical Analysis (QA Quantum Algebra)

Math Subject Class: 33D15, 33D45, 47B36

Comments: 24 pages, AMS-TeX

From: T. H. Koelink, koelink@twi.tudelft.nl

Abstract: The little $q-$Jacobi function transform depends on three parameters. An explicit expression as a sum of two very-well-poised ${}_8W_7-$series is derived for the dual transmutation kernel (a kind of non-symmetric Poisson kernel) relating little $q-$Jacobi function transforms for different parameter sets. A product formula for the dual transmutation kernel is obtained. For the inverse transform the transmutation kernel is given as a ${}_3\phi_2-$series, and a product formula as a finite sum is derived. The transmutation kernel gives rise to intertwining operators for the second order hypergeometric $q-$difference operator, which generalise the intertwining operators arising from a Darboux factorisation.

17. math.CO/0011047

Title: *A non-automatic (!) application of Gosper's algorithm evaluates a determinant from tiling enumeration*

Author: Mihai Ciucu (Georgia Institute of Technology, Atlanta), Christian Krattenthaler (Universität Wien)

Categories: CO Combinatorics (CA Classical Analysis)

Math Subject Class: 05A15 (Primary) 05A16 05A17 05A19 05B45 33C20 52C20 (Secondary)

Comments: 13 pages, AmS-TeX, uses TeXDraw

From: C. Krattenthaler, kratt@ap.univie.ac.at

Abstract: We evaluate the determinant $\det_{1\leq i,j\leq n}\left\| \binom{x+y+j}{x-i+2j} - \binom{x+y+j}{x+i+2j} \right\|$, which gives the number of lozenge tilings of a hexagon with cut off corners. A particularly interesting feature of this evaluation is that it requires the proof of a certain hypergeometric identity which we accomplish by using Gosper's algorithm in a non-automatic fashion.

18. math.QA/0011046 Title: *Orthogonal polynomials associated with root systems*

Author: Ian G. Macdonald (Queen Mary and Westfield College)

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

Journal reference: Séminaire Lotharingien Combin. 45 (2000), Article B45a, 40 pp

Comments: 40 pages, AmS-TeX. This is the 1987 preprint of the same title that has been circulated privately only as a handwritten manuscript. It has now been typed and published in the *Séminaire Lotharingien de Combinatoire*

From: C. Krattenthaler, kratt@ap.univie.ac.at

Abstract: Let R and S be two irreducible root systems spanning the same vector space and having the same Weyl group W, such that S (but not necessarily R) is reduced. For each such pair (R,S) we construct a family of $W-$invariant orthogonal polynomials in several variables, whose coefficients are rational functions of parameters $q,t_1,t_2,...,t_r$, where r (=1,2 or 3) is the number of $W-$orbits in R. For particular values of these parameters, these polynomials give the values of zonal spherical functions on real and $p-$adic symmetric spaces. Also when $R=S$ is of type A_n, they conincide with the symmetric polynomials described in I. G. Macdonald, "Symmetric Functions and Hall Polynomials", 2nd edition, Oxford University Press (1995), Chapter VI.

19. math-ph/0011025

Title: *The $M_L(z);C_L(z);W_L(z)$ associated Laguerre Polynomials*

Author: M. Mekhfi

Categories: MP Mathematical Physics (CA Classical Analysis; FA Functional Analysis)

Math Subject Class: 33C45;34A35

Comments: Latex 2e, 12 pages

From: M. Mekhfi, mekhfim@univ-oran.dz

Abstract: In a previous paper (see the item 7 from above) we deformed Hermite polynomials to three associated polynomials. Here we apply the same deformation to Laguerre polynomials.

20. math-ph/0011021

Title: *A Laguerre Polynomial Orthogonality and the Hydrogen Atom*

Author: Charles F. Dunkl

Categories: MP Mathematical Physics (CA Classical Analysis)

Math Subject Class: 81Q05, 33C25

Comments: 7 pages, LaTeX

From: C. F. Dunkl, cfd5z@virginia.edu

Abstract: The radial part of the wave function of an electron in a Coulomb potential is the product of a Laguerre polynomial and an exponential with the variable scaled by a factor depending on the degree. This note presents an elementary proof of the orthogonality of wave functions with differing energy levels. It is also shown that this is the only other natural orthogonality for Laguerre polynomials.

21. math.CA/0012191

Title: *Discrete bispectral Darboux transformations from Jacobi operators*

Authors: F. Alberto Grünbaum, Milen Yakimov

Categories: CA Classical Analysis

Comments: 30 pages, AMS latex

From: M. Yakimov, yakimov@math.berkeley.edu

Abstract: We construct families of bispectral difference operators of the form $a(n)T + b(n) + c(n)T^{-1}$ where T is the shift operator. They are obtained as discrete Darboux transformations from appropriate extensions of Jacobi operators. We conjecture that along with operators previously constructed by Grˊunbaum, Haine, Horozov, and Iliev they exhaust all bispectral regular (i.e. $a(n)c(n) \neq 0$, for all integer n) operators of the form above.

22. math.CA/0012078

Title: *On some Definite Integrals involving the Hurwitz Zeta function*

Authors: Olivier R. Espinosa, Victor H. Moll

Categories: CA Classical Analysis (GM General Mathematics; MP Mathematical Physics)

Comments: 34 pages, AMS-LaTeX

From: O. R. Espinosa, espinosa@fis.utfsm.cl

Abstract: We establish a series of integral formulae involving the Hurwitz zeta function. Applications are given to integrals of Bernoulli polynomials, $\log\Gamma(q)$ and $\log\sin(q)$.

23. math.CA/0012072

Title: *On the valuation of arithmetic-average Asian options: Laguerre series and Theta integrals*

Author: Michael Schroeder

Categories: CA Classical Analysis (PR Probability Theory)

Math Subject Class: 44A10, 33C15, 60G40

Comments: 20 pages, 1 Figure

From: M. Schroeder, schroder@euklid.math.uni-mannheim.de

Abstract: In a recent significant advance, using Laguerre series, the valuation of Asian options has been reduced by Dufresne to computing the negative moments of Yor's accumulation processes. For these he has given functional recursion rules whose probabilistic structure has been the object of intensive recent studies of Yor and co-workers. Stressing the role of Theta functions, this paper now solves these recursion rules and expresses these negative moments as linear combinations of certain Theta integrals. Using the Jacobi transformation formula, very rapidly and very stably convergent series for them are derived. In this way computable series for Black–Scholes price of the Asian option result which are numerically illustrated. Moreover, the Laguerre series approach of Dufresne is made rigorous, and extensions and modifications are discussed. The key for this is the analysis of the integrability and growth properties of Yor's 1992 Asia density, basic problems which seem to be addressed here for the first time.

24. math.RT/0012220

Title: *Matrix balls, radial analysis of Berezin kernels, and hypergeometric determinants*

Author: Yurii A. Neretin

Categories: RT Representation Theory (CA Classical Analysis; CV Complex Variables; FA Functional Analysis; MP Mathematical Physics)

Math Subject Class: 43A85, 22E46, 53C35, 32A25, 43A90, 33C05, 33E20, 15A15

Report number: ESI-974

Comments: 46 pages

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

Abstract: Consider the pseudounitary group $G = U(p,q)$ and its compact subgroup $K = U(p)$. We

construct an explicit unitary intertwining operator from the tensor product of a holomorphic representation and a antiholomorphic representation of G to the space $L^2(G/K)$. This implies the existense of a canonical action of the group $G \times G$ in $L^2(G/K)$. We also give a survey of analysis of Berezin kernels and their relations with special functions.

25. nlin.SI/0012052:

    Title: *Some Examples of $RS_3^2(3)$-Transformations of Ranks 5 and 6 as the Higher Order Transformations for the Hypergeometric Function*

    Authors: F.V. Andreev, A.V.Kitaev

    Comments: 20 pages

    Subj-class: Exactly Solvable and Integrable Systems

    Abstract: A combination of rational mappings and Schlesinger transformations for a matrix form of the hypergeometric equation is used to construct higher order transformations for the Gauss hypergeometric function.

26. math.QA/0101216

    Title: *Generalized Hermite polynomials*

    Author: Vadim V. Borzov

    Comments: 15 pages, no figures

    Subj-class: Quantum Algebra; Classical Analysis

    MSC-class: 05E35 (Primary) 05E35 (Secondary)

    From: E V. Damaskinskii, `evd@ED6911.spb.edu`

    Abstract: The new method for obtaining a variety of extensions of Hermite polynomials is given. As a first example a family of orthogonal polynomial systems which includes the generalized Hermite polynomials is considered. Apparently, either these polynomials satisfy the differential equation of the second order obtained in this work or there is no differential equation of a finite order for these polynomials.

27. math.CA/0101187

    Title: *Little q-Legendre polynomials and irrationality of certain Lambert series*

    Authors: Walter Van Assche

    Comments: 15 pages

    Subj-class: Classical Analysis; Number Theory

    MSC-class: 33D45; 11J82

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

    Abstract: We show how one can obtain rational approximants for q-extensions of the harmonic series and the logarithm (and many other similar quantities) by Padé approximation using little q-Legendre polynomials and we show that properties of these orthogonal polynomials indeed prove the irrationality, with an upper bound of the measure of irrationality which is as sharp as the upper bound given by Bundschuh and Väänänen for the harmonic series and a better upper bound than the one given by Matala-aho and Väänänen for the logarithm.

28. math.CA/0101188

    Title: *Multiple orthogonal polynomials associated with Macdonald functions*

    Authors: W. Van Assche, S.B. Yakubovich

    Comments: 13 pages

    Subj-class: Classical Analysis

    MSC-class: 33C10; 42C05

    Journal-ref: Integral Transforms and Special Functions 9 (2000), 229-244

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

    Abstract: We consider multiple orthogonal polynomials corresponding to two Macdonald functions (modified Bessel functions of the second kind), with emphasis on the polynomials on the diagonal of the Hermite-Padé table. We give some properties of these polynomials: differential properties, a Rodrigues type formula and explicit formulas for the third order linear recurrence relation.

29. 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

    From: A. Borodin, `borodine@math.upenn.edu`

    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.

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
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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
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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
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22. Question about Kampé de Fériet series

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

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

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

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

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

Is it possible to generalize them?

Ernst Davidovich Krupnikov
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Miscellaneous

1. The SIAG/CST Prize

Call for Nominations
SIAM Activity Group on Control and Systems Theory (SIAG/CST) Prize

The SIAM Activity Group on Control and Systems Theory will present the award at the SIAM Conference on Control and Its Applications, July 12-14, in San Diego. The prize, the second to be given, is awarded to a young researcher for outstanding research contributions, as determined by the prize committee, to mathematical control or systems theory. The contributions must be contained in a paper or papers published in English in peer-reviewed journals.

Eligibility. The awardee's work must be a significant research contribution to the mathematical theory of systems and control, as commonly defined in the mathematical and engineering literature. At least one of the papers containing this work must be published in English in a peer-reviewed journal, bearing a publication date within the award period, and such that at least one of the following two requirements is met at the publication date: either (1) the author is not more than 35 years old, or (2) not more than six years have elapsed since the author received a Ph.D. or equivalent degree.

Description of Award. The award consists of a plaque and a certificate containing the citation. The awardee is expected to attend the award ceremony and to present the award-winning work at the meeting.

Nominations. Nominations including a copy of the nominated paper(s) should be sent by February 28, 2001 to:

Professor Mary Ann Horn
Chair, SIAG/CST Prize Selection Committee
c/o A. G. Bogardo
SIAM
3600 University City Science Center
Philadelphia, PA 19104
Fax: 215-386-7999
E-mail: bogardo@siam.org

Selection Committee. The members of the selection committee for the award are Mary Ann Horn, Chair (Vanderbilt University);Marc Q. Jacobs (Air Force Office of Scientific Research); Daniel E. Koditschek (University of Michigan); Arthur J. Krener (University of California, Davis); and Steven I. Marcus (University of Maryland).

Allison Bogardo
(bogardo@siam.org)

2. Krawtchouk Polynomials Home Page

I would like to invite you to visit the new Krawtchouk Polynomials web site:

http://zelenkov.isir.minsk.by/orthpol/

If you have difficulty accessing this location, use the mirror site at http://www.geocities.com/orthpol/

The old address will automatically redirect you to the new location.

I have added some mathematical search facilities. In the near future, I intend to add some pages in Russian and to update the bibliography.

Vadim Zelenkov
(zelenkov@isir.minsk.by)

3. SIAM Student Travel Awards: 2001 Conferences

SIAM will make several $300 awards to support student travel to its upcoming 2001 conferences:

1. First International SIAM Conference on Data Mining, Chicago, Illinois, April 5-7
2. Sixth SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 20-24
3. Sixth SIAM Conference on Mathematical and Computational Issues in the Geosciences, Boulder, Colorado, June 11-14
4. 2001 SIAM Annual Meeting, San Diego, California, July 9-13
5. Fifth SIAM Conference on Control and Its Applications, San Diego, California, July 12-14
6. Fourth SIAM Conference on Linear Algebra in Signals, Systems, and Control, Boston, Massachusetts, Aug. 13-16
7. First SIAM Conference on the Life Sciences, Boston, Massachusetts, September 24-26
8. First SIAM Conference on the Imaging Science, Boston, Massachusetts, September 26-28
9. Seventh SIAM Conference on Geometric Design, Sacramento, California, November 5-8

The awards will be made from the SIAM Student Travel Fund, created in 1991 and maintained through book royalties donated by some SIAM authors. At the beginning of each year, a committee determines the number of travel awards to be given to support student travel to each SIAM meeting or conference.

Any full-time student in good standing who must travel more than 100 miles to the meeting is eligible to receive an award plus gratis meeting registration. Top consideration is given to students presenting papers at the meeting, with second priority to students who are co-authors of papers to be presented.

An application for a travel award must include:

1) A letter from the student describing his/her academic standing and interests, his/her expected graduation date and degree, advisor's name, and, if available, a URL for a working web page.

2) A one-page vita that includes the student's research interests, projects, and published papers.

3) A detailed letter from the student's faculty advisor indicating why the student deserves to receive a travel award and any special circumstances.

4) If applicable, the title(s) of the paper(s) to be presented (co-authored) by the student at the meeting.

COMPLETE APPLICATIONS MUST BE RECEIVED AT SIAM NO LATER THAN TWO MONTHS BEFORE THE FIRST DAY OF THE MEETING FOR WHICH SUPPORT IS REQUESTED.

Applications should be sent to SIAM, Attention: SIAM Student Travel Awards, 3600 University City Science Center, Philadelphia, PA 19104-2588. Students may also apply by e-mail to `bogardo@siam.org` or by fax to 215-386-7999.

A selection committee will review all complete applications, and winners will be notified FIVE WEEKS before the first day of the meeting. Checks for the awards will be given to the awardees when they pick up their registration packets at the meeting.

Allison Bogardo
(`bogardo@siam.org`)

4. Position in Approximation Theory at Vanderbilt University

We invite applications for a position in approximation theory or related areas, either at the tenure-track (assistant professor) or tenured (associate or full professor) level. Candidates for a tenure-track appointment should have held the PhD for at least two years, and show evidence of outstanding research ability. Candidates for a senior appointment should have a record of exceptional scientific achievement. Evidence of effective teaching is essential. To apply, send the following materials in a single mailing to the attention of Ms. Geneva Shilliday at the address below: letter of application (including e-mail address and fax number), the AMS standard cover sheet fully completed, curriculum vitae, and research summary. Do not send additional information (including letters of recommendation) unless requested to do so after our initial screening. Evaluation of the applications will commence immediately, and will continue until the position is filled.

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Marian Neamtu
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5. New locations for the old issues of the printed Newsletter

Wolfram Koepf who was editor of the printed newsletter between 1994 and 1998 has a new position, and is now "Professor of Computational Mathematics" at Kassel University, Germany, see his homepage

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

Wolfram has archived the back issues of the printed newsletter. His archive has moved to

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

and - thanks to Renato Alvarez-Nodarse - contains the back issues now also in pdf form. Note that Renato has created a mirror site for the back issues at

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

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

6. Updates of the Maple packages for hypergeometric summation

Updates of the Maple packages hsum.mpl and qsum.mpl for hypergeometric summation and q-hypergeometric summation, see my book "Hypergeometric Summation", Vieweg, Braunschweig, 1988, distributed in the USA by the AMS, see

`http://www.ams.org/bookstore`

can be obtained from the web page

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

The updates work now with Maple V and Maple 6, and the names of the updated versions are `hsum6.mpl` and `qsum6.mpl`. They contain implementations of Gosper's, Zeilberger's and Petkovsek's algorithms and their corresponding q-versions.

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

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:

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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 by anonymous ftp from ftp.wins.uva.nl in the directory:

pub/mathematics/reports/Analysis/koornwinder/opsfnet.dir

or at the WWW addresses:

http://turing.wins.uva.nl/ thk/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:

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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.

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