



European Mathematical Society

NEWSLETTER No. 19

March 1996

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NOTICE FOR MATHEMATICAL SOCIETIES

Please note labels are prepared during the second half of the month before the next issue. Would you please send your updated lists before this time.

Many thanks.

Ms T Mäkeläinen

The following item had to be omitted from Newsletter 18 for technical reasons, but has been available on EMIS since December 1995.

EUROPEAN MATHEMATICAL SOCIETY

Report on the Meeting of the Executive Committee
Besançon (France) October 20-21, 1995

Eva Bayer Fluckiger, Jean-Pierre Bourguignon, Alberto Conte, Aatos Lahtinen, László Márki, Peter Michor, Andrzej Pelczar, V.A. Solonnikov and David Wallace were present. Isabel Labouriau was excused.

Pierre Bérard (Chairperson of the Committee on Developing Countries), Mireille Chaleyat-Maurel (Public Relations Officer), Luc Lemaire (Liaison Officer with the European Union), Bernard Prum (Chairperson of the Round Tables Committee of ECM2), Jean-Pierre Puel (President of the Société de Mathématiques Appliquées et Industrielles (SMAI)), Stewart Robertson (Chairperson of the Publications Committee), Tuulikki Mäkeläinen (Secretary of the European Mathematical Society) were invited.

The Executive Committee thanks Eva Bayer for the perfect arrangements and hospitality during the meeting.

SCIENTIFIC ACTIVITIES

European Congress of Mathematics

ECM2 July 22-26, 1996 Budapest (Hungary)

See the Second Announcement in the Newsletter.

Diderot Mathematical Forum

The first conference of the series will take place in the autumn of 1996 with the theme "Mathematics and Finance". It will be organized by P. Embrechts (Zurich) with the following towns and respective local organizers: London (M. Davis), Moscow (A. Shiryaev), Zurich (H. Bühlmann).

The conference could have a day in common in Zurich with the International Statistical Institute which had the same project of a conference on mathematical finance.

Journal of the European Mathematical Society (JEMS)

The special Committee has started to negotiate with a potential Editor-in-Chief. A small group (maybe four) of editors and a larger editorial board are being considered. There should be no restrictions as to the assistant editors but they should be drawn from a balanced list, and the Editor in Chief should have a decisive role in the choice of the assistant editors.

CENTRAL AND EASTERN COUNTRIES COMMITTEE

The difficulty of travelling for Eastern Europe mathematicians and the situation of libraries in Central and Eastern Europe (CEE) are the major concerns.

The Committee suggests that its next action in this direction should be targeted, limited in the time, and closer to the activity of EMS. The Executive Committee thinks that efforts in 1996 should be concentrated on activities around the Budapest Congress and its satellites (information on satellite conferences is on the servers).

As regards libraries, a letter has been sent to some identified institutes. The first output of this action will be presented later on.

COMMITTEE ON DEVELOPING COUNTRIES

The European Union and also national governments have to be persuaded to see the needs of mathematics in developing countries.

One problem is that of libraries. Photocopying services for mathematicians in several developing countries are on demand. Centres with online Zentralblatt could allow developing countries to use their service; but there are problems with personnel time, mailing costs and copyright.

IMU-CDE plans a directory of mathematics (departments etc.) in different developing countries.

The Committee should contact EMS member societies to find out about their programs concerning developing countries.

Education of teachers is crucial for developing countries, having in mind that it needs to be adapted to the local society. There are different classes of developing countries: ones with active mathematical research have also good mathematical education, others lack even school mathematics education.

During the African Mathematical Union (AMU) meeting in Ifrane, it was discussed that African countries wish to join European networks. South Africa joined AMU; they have launched a big change in education with interesting ideas. The North African group would like to have closer connections with EMS. A directory of Centres of Excellence in Mathematics and of Mathematicians in Third World Countries should be very useful: ACMS, ICTP, CIMPA, IMU CDE, and EMS have to cooperate.

The composition of the Committee on Developing Countries is the following : Chairperson : P. Bérard, members: K.D. Elworthy, M. Giaquinta, B. Goldsmith, J.P. Gossez, J.F. Jaulent, V.N. Maslennikova, A. Pelczar, J.F. Rodrigues and G. Schiffels.

RELATIONS WITH EUROPEAN INSTITUTIONS

Group on Relations with European Institutions

Information gathering and distribution have been successful, advice on making applications has also been well received. The number and the level of applications in mathematics has risen. Regular contacts have been established in Brussels, at different levels. The European Commission has a server (<http://www.cordis.lu>). A link to this server should be made available on the EMS-server.

The changes in programmes are the following :

◊ “Training and Mobility of Researchers” instead of “ Human Capital and Mobility”, which is discontinued.

◊ “Large Scale Facilities” : most of the money goes to facilities, not to fellows, which is problematic for mathematics.

◊ Networks: new rules have been installed to accommodate the new policy: institutional fellowships abolished, and the money moved to networks, each network to have at least 5 laboratories from 3 different countries with a budget of at least 1 MEcu. There is need for flexible rules so that for example the mathematical panel will be allowed to attribute smaller sums per network. Another possibility would be to allow the panel to merge some applications of scientifically close networks.

◊ Euroconferences and Summer Schools : The programme functions now, with a definite policy: about 100 persons attending conferences organized by European oriented

societies. It is suggested to supply summer schools with money for travel grants to Eastern European mathematicians.

The EMS has to think about an influence on the new budget for Eastern countries and the national representatives/committees in Brussels.

Lobbying in Brussels is necessary. Cooperation with people in industry is needed. EMS should get other societies to be corporate members.

The Committee on the Relations with European Institutions is renamed the Group on Relations with European Institutions with the following composition: Chairperson: J.-P. Bourguignon, with members : E. Bayer, L. Lemaire, F. van Oystaeyen.

Preparations for the Fifth Framework Programme

An EMS-ESF-ESTA (European Science and Technology Assembly) task force met once with the following composition : A. Bensoussan, J.-P. Bourguignon, M. Espedal, J. Fenstad, K.H. Hoffmann and H.P.F. Swinnerton-Dyer. It worked fruitfully and produced a draft in order to make mathematics more present in the Programmes of the European Commission. It pointed out that the future development of mathematics can be severely handicapped by policy makers' inadequate appreciation of three basic facts :

◊ the rate at which new mathematics is produced continues unabated.

◊ the impact that mathematics has on society is growing so fast and so steadily that the number of contact points between mathematics and the man in the street has gone up considerably without his noticing it.

◊ the need for keeping all components of this science in connection with one another has never been as strong as it is now.

Euresco

The European Research Conference programme, conducted by the ESF, is a series of conferences, every other year, on topics of the highest interest and importance. The aim is to hold finite series. Funds are basically from EU, imposing restrictions. Speakers are invited, young people are encouraged to apply. Information on the programme is to be announced in the Newsletter. The conferences should not be summer schools.

Next conferences are :

European Research Conferences, Mathematics:

◊ *Mathematical Methods in Industrial Problems*

1996 : Multi-scale Analysis in Image Processing: Mathematical and Numerical Models for the Simulation of Turbulent and Reactive Flows, Alfio Quarteroni (Milano), February 1996, Mont St. Odile (near Strasbourg), France.

◊ *Algebra and Discrete Mathematics*

1996 : Group Theory: Finite to Infinite (Laszlo Babai, Chicago), Castelvecchio, Italy, 13-18 July, 1996

◊ *Number Theory and Arithmetical Geometry*

1997 : (Gerhard Frey, Essen), autumn of 1997.

INFORMATION SERVICES

European Mathematical Information Service (EMIS)

The EMS server (EMIS) is functioning at <http://www.emis.de>. Its launching had a great success : about 600 people got connected on the first day.

Each individual member has to be given an opportunity to refuse to have their name and address in a public directory accessible through EMIS. A personal letter to individual

members asking them to indicate if they refuse to have their name and address on the server shall be sent. The individual members are given a code to have access to the list for a limited period of time, in order to supply the individual members a possibility to check the list of members for the elections of delegates of individual members.

WORLD MATHEMATICAL YEAR 2000 (WMY 2000)

V. L. Hansen is appointed as the chairperson of the WMY 2000 Committee of EMS.

The EMS Committee is composed as follows: Mireille Chaleyat-Maurel (France), Alberto Conte (Italy), Stephen Gelbart (Israel), Vagn Lundsgaard Hansen (Denmark), Michael Hazewinkel (Netherlands), Osmo Pekonen (Finland), Jose Francisco Rodrigues (Portugal).

The member Societies should be informed about the plans for the World Mathematical Year 2000.

RELATIONS WITH MATHEMATICAL INSTITUTIONS

Tbilissi International Centre (Georgia)

The three representatives of EMS appointed on the board of the Centre are : J. C. Hausmann (Switzerland), G. Roach (Scotland) and S. Solonnikov (Russia).

SOCIETY ACTIVITIES

EMS Council

Elections to the Council

The elections of individual member's delegates will take place as follows :

- ◇ December, 1995 : nominations are called for in the Newsletter.
- ◇ End of February, 1996 : nomination forms must arrive at the Society's Office in Helsinki.
- ◇ March, 1996 : postal elections by the individual members.

(see page 8 of this issue. Ed.)

Council Meeting

The Council Meeting of the EMS will take place on July 20-21, 1996 in Budapest. The delegates should arrive on Friday, July 19, 1996 and a (modest) reception should be organized so that the council delegates have the opportunity to meet members of the Executive committee. The Council Meeting is to begin at 9 a.m. on Saturday and the venue is the Lecture Room of the Hungarian Academy of Sciences.

Charter for electronic publishing will be added to the agenda, if ready.

Relationship with member societies

EMS Vice-President D. Wallace will send a letter to corporate members in order to build a database and to get a better knowledge of both present ones as well as candidates. Societies are asked to mention that they belong to EMS in their communications with the following points :

- ◇ application for individual membership should made easy and be publicized.
- ◇ information on ECM2 and WMY 2000.
- ◇ the address of each Society's server is to be obtained, if there is one.
- ◇ individual members will be approached on whether they agree to have their name and address on the server EMIS.

EUROPEAN WOMEN IN MATHEMATICS UPDATE

Caroline Series

January 1996

We should like to report various recent developments in EWM.

The seventh General EWM Meeting took place in Madrid, September 4th-9th 1995, and was attended by 46 participants from 14 countries. A short report of this conference is obtainable from the EWM office in Helsinki and a long report will be published in due course.

The sixth General Meeting was at the Technical University in Warsaw from June 7th-11th 1993, attended by 60 participants from 16 countries. At this meeting, the establishment of EWM as a legal body, was discussed. The legalisation was finalised on December 2nd 1993 under Finnish law. The legal seat of EWM is Helsinki, one reason for this choice being that Helsinki is already the seat of the European Mathematical Society (EMS).

EWM has a two-level structure:

- the local level, which usually functions within a country and has a regional coordinator as its link
- the international level, which is the network connecting the various local groups and consists of the Standing Committee, the international coordinators and the Helsinki office with its secretary Riitta Ulmanen. The secretary is a sort of "fixed point" in this net who collects, updates and distributes information, answers inquiries, keeps membership records and so on.

The address and telephone numbers of the EWM Helsinki office have changed recently and the new address is :

EWM Office, Riitta Ulmanen, Secretary, Department of Mathematics, PO Box 4, Yliopistonkatu 5, FIN-00014 University of Helsinki, Finland

Tel: 358 0 191 22853 Fax: 358 0 191 23213

Email: ulmanen@sophie.helsinki.fi

EWM has regional coordinators in Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Roumania, Russia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.

Application forms for EWM membership may be obtained either from regional coordinators or from Helsinki. There are three membership rates which allow for the many different circumstances of members. The regional co-ordinators collect dues in local currency and forward money to the general account in Helsinki.

The convenor of the standing committee is

Sylvie Paycha (paycha@fr.u-strasbg.math)

and the deputy is

Capi Corrales (capi@emduc11.sim.cm.es).

The International Coordinators are

Capi Corrales (west),

Marketa Novak (central) (marketa@cs.chalmers.se),

Marie Demlova (east) (deml@csearn.bitnet)

and Inna Berezowskaya (Russia).

The EWM email network, which was administered from Rome, has recently been completely reorganised and is now administered by Sarah Rees from Newcastle. To join, mail Sarah at sarah.rees@newcastle.ac.uk

The EWM newsletter appears annually in December/January and is distributed, mainly electronically, free of charge. You will be sent a copy on joining the network; otherwise copies (hard or electronic) and further information on EWM may be obtained from the Helsinki office.

Besides organising the biennial EWM conference, EWM members have played an active rôle in the European Mathematical Society Committee on Women and Mathematics which was set up in January 1991. Investigations have been carried out into the numbers of women mathematicians in different European countries, with some surprising results. Discussions and further investigations have been initiated on those countries with very low proportions of women among mathematicians. The committee also organised round tables at the European Congress in Paris, 1992 and the ICM in Zurich in 1994.

There have been regional meetings in Russia, Sweden, Germany, the UK, and elsewhere. *Femmes et mathématiques*, the organisation of French women mathematicians, is an important and very active group in France. In 1996, several events are planned including a one day forum for young women mathematicians in Paris in January and a general assembly in March in Rennes.

The Russian Women Mathematicians Association (RMWA) was founded at a conference in May 1993 in Suzdal and already has more than 300 members from more than 40 cities of Russia and the FSU. A second International conference took place in Voronezh in May 1995 and the third is planned for Volgograd in May 27-31, 1996. For details contact the organiser Prof. G. Riznichenko, riznich@orgmath.msk.su

In 1995, an EWM group, *associazione italiana donne in matematica*, was formed in Italy. The

German group is also active: there is an email net managed from Magdeburg with about 150 participants and there have been several local meetings including one in Oberwohlfach. A weekend meeting is planned for June 1996. The British group BWM organised a one day meeting in London in September 1995 and a similar day is planned for September 1996.

The next international EWM activity is planned for the Budapest EMS conference in July 1996. There will be a round table on the topic "Females in Mathematics in the Iberian and Scandanavian Peninsulars". EWM is also organising, jointly with

femmes et mathématiques, an interdisciplinary two day workshop on Renormalisation from June 14th-15th 1996 in Paris. There will be a joint Franco-Russian meeting organised by *femmes et mathématiques* and the Russian Association for Women Mathematicians (RAWM) in Marseille in December 1996.

Mathematics Department
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January 1996



New Council Delegates for 1996–1999

The following nominations have been received by 10 February 1996:

Anichini, Giuseppe, Modena, Italy
Bolondi, Giorgio, Sassari, Italy
Branner, Bodil, Lyngby, Denmark
Deshouillers, Jean-Marc, Bordeaux, France
Habetha, Klaus, Aachen, Germany
Karoubi, Max, Paris, France
Kuusalo, Tapani, Jyväskylä, Finland
Lahtinen, Aatos, Helsinki, Finland
Márki, László, Budapest, Hungary
Piccinini, Renzo, Milano, Italy
Puppe, Dieter, Heidelberg, Germany

As there were 11 positions available, the candidates were declared elected, without the need for a ballot.

EMIS

The European Mathematical Information Service

Michael Jost (FIZ Karlsruhe)

February 7, 1996

In June 1995 the 'European Mathematical Information Service' went online under the URL <http://www.emis.de/>. It contains the Electronic Library of the European Mathematical Society, information about the Society, about the European Mathematical Congress 1996 in Budapest, and information about other mathematical servers throughout the world.

Preparations

At the meeting of the Executive Committee of the European Mathematical Society in Cortona/Italy, October 1994, it was decided to set up a system of electronic servers in Europe for Mathematics under the auspices of the EMS.

FIZ Karlsruhe, Dept. of Mathematics and Computer Science in Berlin, the editorial office of *Zentralblatt für Mathematik / Mathematics Abstracts*, has offered to run the master server. At its meeting in Krakow, March 1995, the Executive Committee of the EMS decided unanimously that the master server should be set up and maintained by FIZ Karlsruhe, and the secretary of the EMS Peter Michor was entitled to negotiate the conditions. The format of the server was also agreed upon. It was decided to have mirror servers at various locations. The name EMIS was chosen standing for European Mathematical Information Service.

The work on EMIS started in mid May 1995 at FIZ. The server is officially online since June 21, 1995 when it was first announced at a workshop of the project "Specialized Information" of the Deutsche Mathematiker-Vereinigung (DMV). Further announcements were posted to various internet newsgroups. The server was announced to catalogs of WWW servers and in the September issue of the EMS Newsletter.

Access

The server is accessible using WWW, FTP, and Gopher. World Wide Web access is regarded the primary access method, and therefore not too much work has been done to make FTP and Gopher access really what they could be. EMIS is accessible at the following locations thanks to the very good cooperation of the respective European institutions. The internet addresses of EMIS are

<http://www.EMIS.de/>

Berlin, Master server at FIZ Karlsruhe, Dept. Math. & Comput. Sci.—*Zentralblatt für Mathematik / Mathematics Abstracts*,

Mirror sites:

<http://geom.helsinki.fi/EMIS/>

Department of Mathematics, University of Helsinki,

<http://alf1.cc.fc.ul.pt/EMIS/>

Lisboa, Centro de Álgebra da Universidade de Lisboa,

<http://cirm.univ-mrs.fr/EMIS/>

Marseille, Centre International de Recontres Mathématiques (CIRM),

<http://www.maths.soton.ac.uk/EMIS/>

Southampton, Faculty of Mathematical Studies, University of Southampton.

<http://emis.csi.it:8888/> Torino, Consorzio per il Sistema Informativo (CSI-Piemonte)

Each mirror site maintains its own regularly updated copy of the complete EMIS contents. Through its growing system of mirrors EMIS can provide a good distribution of its services and an easy access to its information by reducing slow long-distance network connections. Moreover, as each mirror server behaves as a backup store, the information in EMIS is fairly insensible to hardware crashes.

All software—besides the bare operating system—used to set up and maintain the server and distribute its contents was chosen to be widely employed public domain software. On the one hand this leads to a minimization of costs, on the other it secures that EMIS will benefit from further expected developments of these programs.

Contents

The server contains general information about the EMS, its statutes and by-laws, an address list of member societies and the main part of the society's Newsletter starting with the September 1995 issue.

Information about the 2nd European Congress of Mathematics in Budapest 1996 and its satellite conferences are available from the server, including the First and Second Announcement and the possibility to pre-register to the conference via e-mail.

Some efforts have been undertaken to collect pointers to other mathematical information systems, making EMIS a good starting point when searching for electronically available information on mathematics. These pointers include links to the International Mathematical Union (IMU), the World Mathematical Year 2000 Newsletter, and the complete, daily updated Lists of Mathematics Information Servers from Penn State University—one of the most complete and recognized catalogs in this area. Here one can select servers of mathematics departments, societies and associations, institutes and centers, companies, mathematics

journals and preprints, and specialized subject area servers. There's also a link to CORDIS, the Community Research and Development Information Service, that provides information about Research and Development sponsored and supported by the European Union.

The Electronic Library of the EMS

The biggest part of EMIS, however, is the Electronic Library of the EMS (ELibEMS), taking about 99% of the total disk space used by the server.

In its Electronic Library the EMS collects the full texts of freely available electronic publications from Europe, and also from other countries, which agree on offering their publications here. This library—supervised by the Electronic Publishing Committee of the EMS—defines high mathematical and editorial standards for its included publications. Journals or Proceedings volumes have to be guided by an editorial board which guarantees that the articles accepted for publication are of good mathematical quality. In particular, every article should have been refereed and recommended for publication by an independent expert. As it is common praxis with printed mathematical publications, no version of the article should have appeared or should appear elsewhere. Hard copies of the articles have to be collected at different places which then will serve as an archive for the volumes. These places preferably should be libraries which should agree to organize the distribution of copies of single articles to mathematicians having no access to the electronic volumes.

With its rapidly growing Electronic Library the EMS gives an example of how scholarly electronic publishing of the future might look like. This major effort of electronically bringing together important mathematical publications was made possible by the support and very good international cooperation of the respective editors and publishers.

Mathematical Journals

ELibEMS includes at present (January 1996) the following journals in full text:

Acta Mathematica Universitatis Comenianae.

Volume 60 (1991)–present

This is the electronic version of *Acta Mathematica Universitatis Comenianae*. The master copies of the files of this journal are maintained at the Comenius University, Inst. of Applied Math., Bratislava.

Annales Academiæ Scientiarum Fennicæ Series A. I. Mathematica.

Volume 18 (1993)–present

Annales Academiæ Scientiarum Fennicæ Series A. I. Mathematica is published by Academia Scientiarum Fennica since 1941. It was founded and edited, until 1974, by P.J. Myrberg. Its editor is Olli Lehto. AASF publishes refereed papers in all fields of mathematics with emphasis on analysis.

Archivum Mathematicum.

Volume 28 (1992)–present

This is the electronic version of *Archivum Mathematicum*. The mathematical journal *Archivum Mathematicum* was founded in 1965. It publishes research articles in all areas of mathematics, preferably in English language.

Beiträge zur Algebra und Geometrie Contributions to Algebra and Geometry.

Volume 34 (1993)–present

The mathematical journal *Beiträge zur Algebra und Geometrie/Contributions to Algebra and Geometry* was founded in 1971 on the occasion of the 65th birthday of O.-H. Keller. It publishes research articles in the areas of algebra, geometry, algebraic geometry and related fields, preferably in English language.

The Electronic Journal of Combinatorics.

Volume 1 (1994)–present

The *Electronic Journal of Combinatorics* is a refereed all-electronic journal that publishes papers in all branches of discrete mathematics, including all kinds of combinatorics, graph theory, discrete algorithms, etc. The master copies of the files of this journal are maintained at the Georgia Institute of Technology in Atlanta, GA, USA.

The Electronic Journal of Differential Equations.

Volume 1 (1993)–present

The *Electronic Journal of Differential Equations* (EJDE) is a strictly electronic publication dealing with all aspects of differential equations (o.d.e.'s, p.d.e.'s, integral equations, functional differential equations, etc.), and their applications. The master copies of the files of this journal are maintained at Southwest Texas State University, San Marcos, TX, USA.

Electronic Journal of Probability and Electronic Communications in Probability.

Volume 1 (1996)–present

Electronic Journal of Probability and Electronic Communications in Probability publish papers in all areas of probability. The master copies of the files of this journal are maintained at the University of Washington Mathematics Department, Seattle, WA, USA.

Electronic Research Announcements of the American Mathematical Society

Volume 1 (1995)–present

Electronic Research Announcements is the American Mathematical Society's first electronic-only journal. ERA-AMS publishes high quality research announcements of significant advances in all branches of mathematics. The master copies of the files of this Journal are archived by the American Mathematical Society.

Electronic Transactions on Numerical Analysis.

Volume 1 (1993)–present

Electronic Transactions on Numerical Analysis (ETNA) is an electronic journal for the publication of significant new and important developments in numerical analysis and scientific computing. The master copies of the files of this journal are maintained at Kent State University, Dept. Math. & Comput. Sci., Kent, OH, USA.

Journal of Lie Theory.

Volume 1 (1991)–present

Journal of Lie Theory is a journal for speedy publication of information in the following areas: Lie algebras, Lie groups, algebraic groups, and related types of topological groups such as locally compact and compact groups. Applications to representation theory, differential geometry, geometric control theory, theoretical physics, quantum groups are considered as well.

Revista Colombiana de Matemáticas.

Volume 28 (1994)–present

Revista Colombiana de Matemáticas publishes original research papers in all areas of pure and applied mathemat-

ics. The *Revista* is a joint publication of the Sociedad Colombiana de Matemáticas and the Universidad Nacional de Colombia (Bogotá). The electronic edition coincides with the printed edition, and it is published under the auspices of the Hemeroteca Nacional Universitaria, ICFES.

Southwest Journal of Pure and Applied Mathematics

Volume 1 (1995)–present

The *Southwest Journal of Pure and Applied Mathematics* is an electronic journal devoted to the study of pure and applied mathematics and related topics. The master copies of the files of this journal are maintained at Cameron University, Lawton, OK, USA.

Theory and Applications of Categories.

Volume 1 (1995)–present

Theory and Applications of Categories is the all-electronic, refereed journal on Category Theory, categorical methods and their applications in the mathematical sciences. The master copies of the files of this journal are maintained at Mount Allison University, Sackville, New Brunswick, Canada.

Five more journals are in preparation:

Journal of Convex Analysis,

Mathematica Bohemica,

Mathematica Pannonica,

Rendiconti dell' Istituto di Matematica di Trieste,

Universitatis Iagellonicae Acta Mathematica.

Mathematical Conference Proceedings

The aim is to collect here all freely available electronic versions of refereed conference proceedings and other series of papers in full text.

Proceedings of the 5th International Conference on Differential Geometry and Its Applications Opava, Czechoslovakia, August 24-28, 1992.

Part I. Analysis and Topology on Manifolds

Part II. Differential Equations on Manifolds

Part III. Geodesic and Projective Mappings

Part IV. Geometric Methods in Physics

Part V. Natural Bundles and Natural Differential Operators

Part VI. Riemannian and Kählerian Geometry

Part VII. The Calculus of Variations

In preparation are:

Proceedings of the 6th International Conference on Differential Geometry and its Applications, Brno, Czech Republic, 1995.

Topics: Riemannian geometry, Higher order differential geometry, Geometric theory of differential equations, Geometry of the variational calculus, Analytical mechanics, Mathematical physics.

Proceedings of the 3rd International conference on Approximation and Optimization in the Caribbean, Puebla, Mexico, 1995.

Topics:

– **Approximation:** Wavelets; approximation by polynomials and rational functions; splines; interpolation; expansion and asymptotic analysis; approximation by operators; orthogonal polynomials; theory of functions.

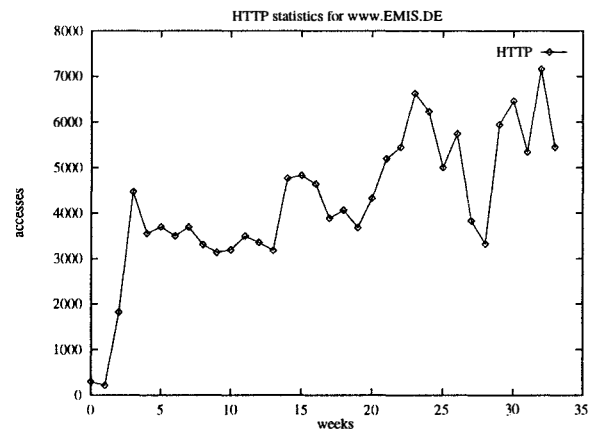
– **Optimization:** Linear and nonlinear, discrete, parametric, multiobjective, global, stochastic and nonsmooth optimization; control theory; variational problems; complexity theory; game theory and mathematical economics.

– **Numerical and Computational Methods:** Numerical and computational methods of approximation, optimization and nonlinear equations; continuation methods and bifurcation; fixed point methods; large scale optimization.

– **Applications:** Energy models; models of business and engineering; robotics; pattern recognition; neural nets; computer-aided design; data compression; models of ecology and natural sciences.

Access statistics

From its very beginning EMIS was a great success with respect to the number of files retrieved from all over the world. The following figure shows the number of accesses to the EMIS master server per week for the first half year that the server was online. The accesses to the mirror servers and connections using ftp or gopher are not included into this diagram.



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Professor Dr. Bernd Wegner

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European Commission Programme Training and Mobility of Researchers

Information on this programme is now available directly from the EC via Internet on:
<http://www.cordis.lu>

Recall that the various parts of this programme are the following.

Individual fellowships These are grants for scientists of one member state wishing to work for a period in a department of another member state.

There are various categories.

B20: Doctoral grants

B30: Post-doctoral grants, for those having already obtained their Ph.D. Essentially, the age limit is 35.

B40: Grants for established researchers, particularly from industrialized regions, who wish to join a team in a less favored region to import their research experience.

Return grants: For researchers of less favored regions, who have benefited from a grant and want to go back to their country.

There are regular calls for proposals.

Networks These are networks of at least 5 groups in at least 3 countries, working on a specific theme.

The accent is put on training, so that more than half the money should be used as salaries for young researchers. The rest should help improving collaboration of the groups in the network.

Note that these rules lead to a situation not suitable for mathematical research: large amounts of money have to be concentrated on a small number of small specialized networks.

It is possible that some rules change before the next call for proposals, so that it will be necessary to check regularly Cordis. In

particular, the next deadline for applications could change.

In the fellowships and networks categories, the available budget is shared between the various sciences proportionally to the amounts applied for. The applicants who were not funded (the rates of success are very small) might find some solace in the fact that their application increased the number of successful ones in mathematics.

Accompanying measures These are essentially Euroconferences and Summer Schools, defined as series of meetings on a theme. The Summer Schools should particularly stress the training of young scientists.

The present call for proposals in this category has deadline April 1.

Information packages Information packages, including application forms, can be obtained by fax at the following numbers (32 2)2962136, 2962133, 2956995 or 2963270.

Cooperation with developing countries A call for proposals will be launched on 15 march 1996. At the time of writing, I don't know what subjects will be covered.

Information will be available on:

http://www.cordis.lu/cgi/build_doclist.pl

(scroll down to INCO and select information package for part C).

Also on <http://www.cec.lu> (under DG 12 entry)

Cordis The final advise will be to consult Cordis rather regularly, to be able to introduce applications within the deadlines.

Luc LEMAIRE
Liaison Officer with the E.C.

EUROPEAN POST-DOCTORAL INSTITUTE FOR THE MATHEMATICAL SCIENCES

The European Post-Doctoral Institute for the Mathematical Sciences was founded in October 1995 by the Institut des Hautes Études Scientifiques (Bures-sur-Yvette, France), the Isaac Newton Institute for Mathematical Sciences (Cambridge, United Kingdom) and the Max-Planck-Institut für Mathematik (Bonn, Germany) in order to create a European mathematical space of excellence for young post-doctoral fellows.

The grants distributed for a two-year period by the EPDI will allow them to move around and progress, during 6 to 12 months, in one of these research centres, among the best in Europe, and to be in daily contact with leading mathematicians from all over the world. They will then be able to spend the rest of the time in another institution, still in Europe, private or state-controlled.

The EPDI programme aims to increase the mobility of young mathematicians within Europe, to support their formation at the highest level and to prepare their entry into an academic industrial or public research career.

- **For whom is the EPDI programme intended?**

The EPDI programme is meant for young European scientists interested in fundamental mathematics or the applications of mathematics, who have obtained their PhD one or two years earlier and who wish to pursue their research at one of the three founder institutes, and then at another European institution (private or state).

- **Description of grants**

- At least 5 two-year grants:

6 to 12 months in one of the three founder institutes (Max-Planck-Institut für Mathematik, Institut des Hautes Études Scientifiques, Isaac Newton Institute for Mathematical Sciences).

12 to 18 months in another European institution (Research centre, university, corporation, etc).

- At least half of the time is to be spent outside the native country.

- Domains to be considered in this call for applications: mathematical sciences in the wide sense (pure mathematics – applications of mathematics – mathematical physics) with particular attention to the domains mentioned below.

Conditions for application

- European citizenship (European Union, associated countries and Eastern European countries);
- PhD or equivalent in Mathematical Sciences obtained in 1994 or later (no matter where, in Europe or elsewhere).

- **How to apply to the EPDI programme?**

- Get an application form by electronic mail:

application-epdi@ihes.fr

fill it out and send it back, together with the documents listed, to:

IPDE - 35 route de Chartres
F-91440 Bures-sur-Yvette
FRANCE

Tel: (33)(1) 69 07 48 53

Fax: (33)(1) 69 07 39 97

Email: ipde@ihes.fr

- Deadline for applications:

February 25th, 1996.

- **Selection of the applicants**

Applications will be examined and selected by an international Scientific Committee.

The Capture of the Mathematical Literature from 1868 to 1942

A Proposal to Make a Database from

Jahrbuch über die Fortschritte der Mathematik

The editors-in-chief of *Mathematical Reviews*, Keith Dennis, and *Zentralblatt für Mathematik*, Bernd Wegner, agreed on a cooperation with the goal to make a database from *Jahrbuch über die Fortschritte der Mathematik*. This project has been endorsed by the Board of Trustees of the American Mathematical Society and the Executive Committee of the European Mathematical Society. The technical and scientific work on the project will be based on the facilities available at the editorial offices of *Mathematical Reviews* and *Zentralblatt*, but it mainly has to be covered financially by additional funding.

In particular, for the scientific improvement of the data taken from the *Jahrbuch* the project has to rely on the support from many volunteers. This announcement giving a short description of the project hopefully will motivate several research mathematicians to join the planned board of associate editors for the project. What the task of these editors should be will be resumed at the end of this article.

1. Goal of the Project

The goal of the project is to produce a searchable database covering the mathematical literature which appeared between 1868 and 1942 based on the *Jahrbuch* published by Walter de Gruyter & Co. Such a database would be an important tool for both mathematical research and the history of science. Together with the databases MATH of the *Zentralblatt für Mathematik*, published by the Fachinformationszentrum Karlsruhe, and MathSci of *Mathematical Reviews*, published by the American Mathematical Society, this would make available an almost complete record of the published mathematical literature from 1868, the year the *Jahrbuch* was founded, to the present.

An electronic version of the *Jahrbuch* will address the increasing pressure on mathematicians and historians of science to be able to recover information on the literature in a convenient and time-saving manner. This will be facilitated by providing an off-line database in the form of a CD-ROM in addition to the online service.

2. Structure and Content of the Database

The structure of the database will be similar to those of the modern mathematical databases mentioned above. The experience gathered during the entry of the back files for both databases can thus be used for the construction of a database for the *Jahrbuch*.

In a first phase the material in the *Jahrbuch* will be entered and the data broken up into parts to be stored in separate tagged fields for author, title, source, subject, review text and reviewer. This work, which is mostly to be viewed as mechanical, will then be supplemented by intellectual review in the following phase so that the end product has the quality of an excellent searchable database of the mathematical literature.

The main tasks to be done in order to reach this goal are the following:

- a) the classification of the articles according to the current Mathematics Subject Classification (MSC) scheme,
- b) the assignment of free keywords in English as an important supplement to the classification, mentioned above,
- c) each item listed whose title is not in English will be given an additional English title,
- d) further description of individual items will be achieved by the addition of commentaries,
- e) a standardization of the abbreviations of journal titles will be given, like that in the modern databases, and in case the title of a journal has changed the various versions of the title will be identified,
- f) pointers how to obtain the original literature will be provided,
- g) as careful author identification as possible will be undertaken.

3. Status of the Project

The *Jahrbuch* covers 75 years, in as many volumes. Each annual volume contains reviews of almost all mathematical works that appeared during the corresponding year. The total number of publications covered by the *Jahrbuch* is estimated to be 220,000.

Publication rights for the data of the *Jahrbuch* have been granted by Walter de Gruyter & Co. to the editors of the database. The first step of the project will be to store the data electronically as they appear in the *Jahrbuch*. The problem of the financial funding of this first step is open, but some amount of money is available to begin with the storage of some subset of the data already.

The next step will be to ask the associate editors to provide the additional data for the single items by assigning the classification and the keywords, translating the titles and adding comments if possible. In order to avoid high costs for the production of the data base we hope that this work could be done by volunteers. In addition to this, in many cases it will be a difficult task to provide a correct link between the subjects of the articles reviewed in the *Jahrbuch* and modern mathematical subjects. Hence, a widely spread board of associate editors will enable us to benefit from the expertise of the research mathematicians world-wide for this task.

Those who are interested in a cooperation as associate editors are kindly requested to contact the following address: Bernd Wegner, Fachbereich Mathematik, TU Berlin, Straße des 17. Juni 135, D 10623 Berlin, e-mail: wegner@math.tu-berlin.de.

EUROPEAN NEWS: Country by Country

BELGIUM

Workshop

Drinfeld modules, modular schemes and applications.

Date: September 9 - September 14

Location: The meeting will take place in the conference centre of the Flemish community: Alden Biesen, Bilzen-Rijkhoven (near to Hasselt, Belgium) An instructional meeting with as main aim bringing together research students and specialists to have lectures and discussions on the different parts and aspects of the theory of Drinfeld modules.

Preliminary scheme for the program:

1. Drinfeld modular schemes
 - 1.1 Construction
 - 1.2 Algebraization
 - 1.3. Compactification
2. Applications
 - 2.1 Modular forms
 - 2.2. Arithmetic of global function fields and of division algebras over global function fields.

2.3. Elliptic curves over function fields

Persons interested in attending this meeting organised by Ernst Gekeler, Marc Reversat, Marius vander Put, Jan Van Geel should contact

Jan Van Geel
 University of Gent
 Department of Pure mathematics
 and computer algebra
 Galglaan 2,
 B-9000 Gent Tel: 32 - 9 - 264.48.98
 Belgium Fax: 32 - 9 - 264.49.93
 email: jvg@cage.rug.ac.be

Announcements concerning the meeting can also be found on internet:

<http://cage.rug.ac.be/~jvg/workshop.html>

First Announcement

Workshop on Crystallographic Groups and their generalizations.

**Katholieke Universiteit Leuven Campus Kortrijk
 Faculteit Wetenschappen, Departement Wiskunde**

Organized by the algebra research unit at **Kortrijk (Belgium)**

May 20 - 21, 1996. The aim of the meeting is to report on and to discuss recent developments and problems in the field.

Invited talks will be given by

H. Abels (Universität Bielefeld), **W. Goldman** (University of Maryland, College Park), **F. Grunewald** (Universität Düsseldorf), **K.B. Lee** (University of Oklahoma, Norman), **F. Raymond** (University of Michigan, Ann Arbor), **D. Segal** (Oxford University)

Scientific Committee: The main speakers and P. Igodt (K.U.Leuven)

Topics involved:

Recent developments concerning crystallographic groups, and all concepts which can be seen as generalizations of them, are the subject of this workshop. Let us give a non-exhaustive list of possible topics:

- Affine crystallographic groups and affine manifolds.
- Almost crystallographic groups and infra-nilmanifolds.
- Polynomial structures on polycyclic-by-finite

groups and more generally, any explicit construction of a spherical manifolds.

Left symmetric structures on Lie algebras.

Discrete subgroups of nilpotent/solvable Lie groups.

Where: Kortrijk is situated 85 km west of Brussels, in the province of West-Vlaanderen. It is only 35 km north of the French city Lille. The highway E17 is passing through Kortrijk, having an exit near the university.

From Brussels, as well as from Lille, there are frequent train connections to Kortrijk. Both Brussels and Lille have an international airport. From Lille there are several rapid-train (TGV) connections (e.g. to Paris, London).

For further information: Please contact

Paul Igodt, Karel Dekimpe, Wim Malfait
 Department of Mathematics
 K.U.Leuven Campus Kortrijk
 B-8500 Kortrijk, Belgium
 e-mail: workshop@kulak.ac.be
 Fax: (00 32) - 56 24 69 99, (attn. Paul Igodt)

The latest information will be updated on the following web-site:

<http://www.kulak.ac.be/workshop/workshop.html>

CROATIA

CROATIAN MATHEMATICAL SOCIETY Bijenička 30, 10 000 Zagreb, Croatia
 phone: (385-1)-4555-720; fax: (385-1)-432-484; e-mail: congress@math.hr

CROATIAN MATHEMATICAL CONGRESS

Zagreb, Croatia – July 18 - 20, 1996

Second Announcement

The Croatian Mathematical Society is pleased to invite you to attend the First Croatian Mathematical Congress, to be held in Zagreb, Croatia, July 18 - 20, 1996. Congress will have a strong international component, and it will be open to all areas of mathematics.

Congress activities will start on Thursday morning, July 18, and will end on Saturday afternoon, July 20, 1996. Congress activities will take place in the lecture rooms of the Department of Mathematics, University of Zagreb, Bijenička 30, situated in the northern, residential area overlooking downtown Zagreb. Note that Sunday, July 21, 1996 is the arrival date for the 2nd European Congress of Mathematics, to be held in Budapest, Hungary (six hours by train from Zagreb).

Scientific Program. The program includes approximately 20 invited lectures, and short (15-minutes) communications by Congress participants selected by the Scientific Committee. The abstracts of selected talks will be published in the Program of the Congress. The official languages of the Congress are English and Croatian.

Deadlines. If you wish to attend the Congress, please return the attached registration form by March 15, 1996. If you are interested in giving a short communication at the Congress, please submit the abstract of your talk (at most 200 words) by April 15, 1996. The Scientific Committee will notify you of its decision. All correspondence should be addressed to the secretary of the Congress: Hrvoje Šikić, Department of Mathematics, University of Zagreb, Bijenička 30, 10 000 Zagreb, Croatia.

The registration fee will be 75 DM.

The list of invited speakers includes:

J. Azéma (Paris), J. Barlow (University Park, Penn.), J. Bertoin (Paris), A. Bourgeat (Saint-Etienne), R.J. Daverman (Knoxville), J.W. Demmel (Berkeley), R. Fritsch (München), A. Ivić Weiss (York, Canada), Z. Janko (Heidelberg), A.

Mikelić (Lyon), D. Miličić (Salt Lake City), E. Molnar (Budapest), S.J. Patterson (Göttingen), Z.R. Pop-Stojanović (Gainesville, Florida), M. Rao (Gainesville, Florida), J.R.M. Sanjurjo (Madrid), K. Veselić (Hagen), M.V. Wickerhauser (St.Louis), K. Yelick (Berkeley).

Scientific Committee: (all from the University of Zagreb) I. Aganović, D. Butković, E. Coffou, V. Hari, S. Kurepa, R. Manger, S. Mardešić, B. Najman (chairman), M. Polonijo, M. Primc, H. Šikić (secretary), Z. Šikić, M. Tadić, Z. Tutek, D. Veljan, V. Volenec, Z. Vondraček.

Transportation. The Zagreb Airport has direct flights to several major European airports. *Croatia Airlines* has everyday flights to Frankfurt, London, Munich, Prague, Vienna, Zurich. Five days a week it has flights to Amsterdam, Paris, Rome. Two to four times a week it has flights to Berlin, Brussels, Moscow, Copenhagen, Stuttgart, Skopje, Warsaw. *Lufthansa* has everyday flights to Frankfurt and Munich. *Air France* has flights to Paris five days a week. *Czech Airlines* has everyday flights to Prague.

Several European cities are connected with Zagreb by train every day; Budapest (five times a day), Vienna (twice a day), Venice, Munich, Geneva, Leipzig, Ljubljana.

Accommodations. Here is the list of some Zagreb hotels that can be reached from the site of the Congress by public transportation in 20 - 30 minutes. The prices listed are per night/w.breakfast (single-bed and double-bed occupancy), include taxes, and are subject to change.

Dubrovnik (DM 118, DM 160), *International* (DM 118, DM 150), *Jadran* (DM 100, DM 125), *Panorama* (DM 105, DM 120), *Laguna* (DM 115, DM 150), *Intercontinental* (DM 270, DM 340). We may be able to ensure discount in some of the hotels for groups of 10 and more. We also hope to have available some places in student dormitories (more details in the spring of 1996).

CATALONIA

AMENDMENT TO ANNOUNCEMENT IN NEWSLETTER NO.18 PAGE 19.

CRM Advanced Course on Geometry and Physics

Dates: July 2 to July 12, 1996

abf Location Centre de Recerca Matemàtica,
Campus of the Universitat Autònoma de Barcelona,
Bellaterra, Spain

Speakers:

G. Segal, Cambridge University, "Conformal field theories"

D. Kotschick, Basel University, "Four-manifolds and Seiberg-Witten gauge theory"

L. H. Kauffman, Chicago University, "Invariants of links and manifolds"

Coordinators: Sebastià Xambó and Vicenç Navarro (Barcelona)

Deadline for registration: April 15, 1996

Further information:

<http://crm.es>, or e-mail to crm@crm.es

FRANCE

XXVIth Probability Summer School Saint-Flour (Cantal)

19th August - 4th September, 1996

Invited Speakers

Professor E. Gine
University of Connecticut (U.S.A.)
"Bookstrap; U-statistics and U-processe"

Professor G.R. Grimmett
University of Cambridge (Great Britain)
"Percolation and Disordered System"

Professor L. Saloff-Coste
University of Toulouse (France)

"Quantitative techniques for finite Markov chains"

Contact

P. Bernard, Université Blaise Pascal
Mathématiques Appliquées
F63177 AUBIERE CEDEX

Tel: 73 40 70 52 or 73 40 70 50

Fax: 73 40 70 64

Email: bernard@ucfma.univ-bpclermont.fr

Das Mathematische Forschungsinstitut Oberwolfach veranstaltet in Zusammenarbeit mit der Deutschen Mathematiker-Vereinigung vor allem für jüngere Mathematiker (mit abgeschlossener oder fortgeschrittener Hochschulausbildung) Fortbildungsseminare aus dem Bereich der Mathematik einschließlich ihrer Rand- und Anwendungsgebiete. Einerseits sollen junge Mathematiker in ihrem eigenen Arbeitsbereich weiterführende Erfahrungen sammeln und Kontakte mit Fachleuten gewinnen. Andererseits sollen die Seminare aber auch Gelegenheit bieten, Methoden und Ergebnisse fremder Arbeitsgebiete kennenzulernen mit dem Ziel, den mathematischen Horizont zu erweitern und sich vielleicht auch ein weiteres Arbeitsfeld zu erschließen.

Die Teilnehmer erhalten einen Zuschuß zu den Reise- und Aufenthaltskosten. Alle Seminare finden im Mathematischen Forschungsinstitut Oberwolfach statt. Die Zahl der Teilnehmer ist auf jeweils 25 begrenzt.

Interessenten erhalten auf Anfrage weiteres Informationsmaterial. Bitte beachten Sie hierzu auch unseren WWW Server (<http://www.mfo.de>). Die Anmeldung zu einem Seminar sollte möglichst frühzeitig erfolgen bei

Prof. Dr. Matthias Kreck
Universität Mainz
Fachbereich Mathematik
55099 Mainz

Bitte fügen Sie der Anmeldung eine kurze Schilderung Ihres Werdeganges, Ihres Arbeitsgebietes und Ihrer derzeitigen Tätigkeit bei.

1. Quantengruppen in Mathematik und Physik

vom 3. bis 9. März 1996, Anmeldung bis 31. Januar 1996

Referenten: Tammo tom Dieck (Göttingen), Julius Wess (München)

Subjects: Quantengruppen als Deformation von Lie-Algebren; Hopf-Algebren; Tensorkategorien; Quantendoppel; R-Matrizen; nicht-kommutativer Differentialkalkül; q-deformierter Phasenraum; q-deformierte Quantenmechanik und Feldtheorie; Anwendung auf Knoten und Mannigfaltigkeiten.

Prerequisites: Grundbegriffe der Algebra: Algebren, Moduln, Kategorien, Tensorprodukt; Theorie der Lie Algebren und deren Darstellungen; Poincaré Gruppen und deren unitäre Darstellungen; Quantenmechanik, relativistische Feldgleichungen.

2. Parallel Methods for large linear Systems of Equations

vom 3. bis 9. März 1996, Anmeldung bis 31. Januar 1996

Referenten: Peter Bastian (Stuttgart), Erik van de Velde (Pasadena/USA), Gabriel Wittum (Stuttgart)

Subjects: Abstract: Large (sparse) systems of linear equations arise often in the solution of partial differential equations. In the last two decades a number of direct and iterative schemes have been developed for their fast resolution.

Keywords: Numerical methods for PDE, parallel programming, direct methods, sparse direct methods, simple iterative schemes, multigrid method, domain decomposition, adaptive grid refinement, dynamic load balancing.

Prerequisites: Linear algebra, partial differential equations, programming experience, if possible.

3. Introduction to the Langlands Program

vom 26. Mai bis 1. Juni 1996, Anmeldung bis 1. April 1996

Referenten: Werner Müller (Bonn), Thomas Zink (Bielefeld)

Subjects: At the heart of Langlands' program is the general notion of an automorphic representation π and its L-function $L(s, \pi)$. These notions are both defined via group theory and harmonic analysis on adelic groups and are generalizations of the classical modular forms and their Hecke L-functions. The conjectures of Langlands (roughly) amount to the assertion that the other known L-functions arising in number theory and algebraic geometry are nothing but special realizations of automorphic L-functions. The following subjects will be discussed: classical modular forms and automorphic representations of $GL(2)$, L-function of an automorphic representation, the principle of functoriality of Langlands, L-functions of algebraic varieties and their relation to automorphic L-functions, especially for abelian varieties of CM-type, modular curves and Shimura curves.

Prerequisites: Basic knowledge about analytic functions, functional analysis, algebraic number theory, algebraic geometry.

4. Probability and Algorithms

vom 26. Mai bis 1. Juni 1996, Anmeldung bis 1. April 1996

Referenten: Richard Karp (Seattle/USA), Alistair Sinclair (Berkeley/USA), J. Michael Steele (Philadelphia/USA)

Subjects: Basic randomized combinatorial algorithms: e.g. MaxCut, MinCut, network reliability, maximal independent set, pattern matching, algebraic identities. Randomized on-line algorithms against various types of adversaries. Algorithmic applications of random walks: approximate counting, volume and integration, Monte Carlo methods in statistical physics, search heuristics in combinatorial optimization. Concentration of measures: bounded difference methods, martingales, concentration inequalities. Talagrand's isoperimetric inequality; applications in combinatorial optimization, e.g. the Traveling Salesman Problem, minimum spanning tree, minimum cost matching, longest common subsequence, longest increasing sequence.

Prerequisites: Basic background in combinatorial algorithms and discrete probability.

5. Classical Nonintegrability, Quantum Chaos

vom 21. Juli bis 27. Juli 1996, Anmeldung bis 28. Mai 1996

Referenten: Andreas Knauf (Berlin), Yakov Sinai (Moskau, Princeton)

Subjects: Some classical dynamical systems are ergodic on their compact energy surface or lead to irregular scattering in the non-compact case. The corresponding quantum systems then exhibit some form of quantum chaos. In particular their eigenfunctions are delocalized (Shnirelman's theorem). Zeta functions are a useful tool for the analysis of these systems.

Prerequisites: Basic knowledge of differential equations, manifolds, and probability theory.

6. Seiberg-Witten Theory for 4-Manifolds

vom 21. Juli bis 27. Juli 1996, Anmeldung bis 28. Mai 1996

Referenten: Stefan Bauer (Bielefeld), Dietmar A. Salamon (Warwick/U.K.)

Subjects: Spin^c-structures, Dirac operators, the Seiberg-Witten monopole equation and its moduli space of solutions, definition and elementary properties of the Seiberg-Witten invariants. Consequences, some new, some known from Donaldson theory, for the differential topology of 4-manifolds (e.g. generalized adjunction inequalities). The special cases of Kähler surfaces and of symplectic 4-manifolds; connection to Gromov's theory of pseudo-holomorphic curves in symplectic 4-manifolds.

Prerequisites: Basic knowledge of differential geometry of Riemannian manifolds is required; some familiarity with symplectic or complex geometry or with functional analysis (Fredholm theory) will be helpful.

GERMANY

European Research Conference On the Psychology of Mathematics Education September 19 - October 2, 1995

Haus Ohrbeck near Osnabrueck, Germany.

The conference was set up to coordinate and to strengthen the European research in the field of the psychology of mathematics education. It was organized by Elmar Cohors-Fresenborg (Osnabrück) and Hartwig Meissner (Münster). There were 22 research reports and about 6 posters from about 50 participants from 19 different countries. Deutsche Forschungsgemeinschaft had given scholarships for 13 colleagues from middle- and eastern European Countries to participate at the conference.

Three time slots for discussions were used to get information about the different research traditions in Europe, to analyse the European needs concerning the research field "psychology of mathematics education" and to develop ideas to start or to continue European research

cooperations.

There was a broad consensus for European Research Conferences on Mathematical Education which will deal with teaching and learning mathematics, not only concentrated on the psychological perspective. To foster the European cooperation there is a need for better information concerning "European Research in Mathematical Education". Professor Dr. Elmar Cohors-Fresenborg (University of Osnabrueck) and Professor Dr. Inge Schwank (Forschungsinstitut für Mathematikdidaktik e.V., Osnabrück) will establish an information desk which can be reached by email:

erme@informatik.uni-osnabrueck.de or

<http://www.erme.uni-osnabrueck.de/>

Herzliche Grüsse ,Elmar Cohors-Fresenborg

Modern Mathematical Methods in Diffraction Theory and its applications in Engineering

Location: Freudenstadt, Black Forest

Dates: 30 September - 4 October

Organizer Department of Mathematics, Technical University, Arbeitsgruppe 12, Scho gartenstra e 7, 64289 Darmstadt, GERMANY. smallskip Email: passow@mathematik.th.th-darmstadt.de

HUNGARY

European Mathematical Society Summer Schools

I. Algebraic Geometry

Date: 29 July - 9 August 1996

Location: Eger (Hungary)

Scientific Organizer: János Kollár (Salt Lake City, USA)

ALBERTO CONTE (Italy): Some Topics on Enriques Surfaces and Fano Threefolds

JÁNOS KOLLÁR (USA): Rational and Nonrational Varieties

ANDRÁS NÉMETHI (USA): Invariants of Hypersurface Singularities

BERNARD TEISSIER (France): Comparing Singularities in Algebraic Geometry

Deadline for application: 31 March 1996

The level of the school is roughly that of a second-year Ph.D. course.

Prerequisite: *Shafarevich: Basic Algebraic Geometry*

The lecture series are accompanied by tutorial sessions in the afternoons

Accommodation and half board for the two weeks is **DM 200**

Limited support is available upon request

Local organizer (contact preferred by e-mail):

Károly Böröczky, Jr.

Mathematical Institute of the
Hungarian Academy Sciences
Budapest, Pf. 127., 1364 HUNGARY
e-mail: carlos@cs.elte.hu

ITALY

NATO ASI on Microlocal Analysis and Spectral Theory

23 September - 3 October 1996 Il Ciocco, Castelvecchio Pascoli, Lucca, Italy

A NATO Advanced Study Institute (ASI) will be held in Il Ciocco, Castelvecchio Pascoli, Lucca, Italy, 23 September - 3 October 1996. The scientific organizers are L Rodino (Director), B Helffer, B W Schulze, J Sjöstrand.

The goal of the ASI is to record advances in Microlocal Analysis, with emphasis on applications concerning spectral theory. New results on pseudo-differential operators, boundary value problems and analytic-Gevrey theory will be also presented.

The lecturers will be B Helffer, L Rodino, B Schulze, J Sjöstrand, G Lebeau, E Buzano, G Grubb, V Ivrii, P Laubin, O Liess, A Martinez, C Parenti, E Schrohe, F Treèves, G Zampieri.

Living financial support will be available to pre/post-doctoral level attendees from NATO countries and NATO Cooperation Partner countries. Few Travel grants will also be available.

Applications for participation and support can be submitted before the 15 May 1996, through the Secretary, M Mascarello, Dipartimento di Matematica, Politecnico di Torino
e-mail: MASCARELLO@polito.it

WWW:<http://www.polito.it/dipartim/matematici/iniziati/enindex.html> or Director, L Rodino, Dipartimento di Matematica, Università di Torino, Via C Alberto 10, I-10123, Torino, Italy.

**Dipartimento di Matematica,
Università di Trento,
38050 Povo (TN), Italy**
with the support of
EUROPROJ and GNSAGA

**Centro Internazionale per la
Ricerca Matematica
CIRM (Trento)**

First Announcement-February 96

The above mentioned organizations are sponsoring a school followed by a conference to be held in *Trento-Italy* on *September 3-13, 1996* and titled

“Trends in Algebraic Geometry, Applications and Relations with Physics”

The **School** is scheduled in the period: 4-8 September, with arrival date on Tuesday 3.

The **Conference** is scheduled in the period: 9-13 September. A welcome session is called at 9 p.m. of Sunday the 8-th, at Hotel Bellavista-Levico. In the welcome session the schedule of the conference will be discussed.

Main lecturers of the school will be : V. Alexeev, who will lecture on *Space of Moduli of Projective Varieties*

C.Simpson, C. Walters who will lecture on *Algebraic Stacks*

Tutorial activities and other seminars on related topics will be held during the school. Many of the speakers of the following list will follow the works of the school and hence will interact with the participants.

Tentative list of speakers:

V. Alexeev (Baltimore), A. Beauville (Paris), M. Beltrametti (Genova), F. Catanese (Pisa), L. Chiantini (Siena), C. Ciliberto (Roma II), A. Conte

(Torino), B. Dubrovin (Trieste), Y. Kawamata (Tokyo), Y.I. Manin (Bonn), P. Pirola (Torino), T. Peternell (Bayreuth), R. Salvati Manni (Roma), C. Simpson (Toulouse), A. Vistoli (Bologna), C. Walters (Nice), J. Wisniewski (Warsaw).

Location: The school/conference will take place in Levico, a resort near Trento (Italy), at the Hotel Bellavista.

Reply: We can provide support for a limited number of young researchers. If you are interested in participating (or if you need more information), please contact

*Mr. Augusto Micheletti, CIRM,
I- 38050 POVO (Trento), Italy*

Fax: Italy++461++810629

Email: micheletti@science.unitn.it

The organizing committee consists of:

**M. Andreatta (Trento)- E. Ballico (Trento)
-G. Bolondi (Sassari)** Email:

andreatta or ballico or bolondi@science.unitn.it

SCUOLA MATEMATICA INTERUNIVERSITARIA

SUMMER COURSE IN MATHEMATICS - PERUGIA 1996

In Summer 1996 graduate courses in mathematics will be organized under the sponsorship of the Italian National Research Council and MURST, at the University of Perugia, Perugia (Italy); the courses will take place between July 28 and August 31, 1996.

The courses are directed towards young graduates wishing to study mathematics at a graduate level.

The list of courses offered is attached. Each participant is required to choose two courses for a total of 10 hours a week of lectures in addition to problem sessions. Daily attendance is compulsory for participants. Although written tests will be given by the lecturers, no certification of proficiency will be issued.

Ten fellowships, of 520.000 Italian lire each, will be available to foreign participants to help cover their living expenses during the course. All the participants will be lodged, at no cost, in the Casa dello Studente. Text books, lecture notes and photocopies will be provided by the School.

NO TRAVEL EXPENSES WILL BE REIMBURSED

Applications should be sent by mail to the following address :

Professor Graziano GENTILI (address above
Scuola Matematica Interuniversitaria
Summer Course in Mathematics
Via S. Marta 13/A 50139 - Firenze, Italy

and should reach this address before April 30, 1996. A selection committee will meet shortly afterwards and all foreign applicants will be notified of the result before June 20, 1996. Applications should contain the titles of three courses the applicant would like to attend to (in order of preference) a brief curriculum vitae and a DETAILED CURRICULUM STUDIORUM (including a certificate with the list of university courses taken and corresponding grades).

Applicants are requested to state if their participation is conditioned by the allotment of a fellowship. They should indicate very clearly the exact address to which all correspondence concerning the Summer Course should be mailed.

LIST OF COURSES -- Perugia 1996

- ALGEBRA Prof. J. Bowers, Univ. Leeds
(lectures in English)
- COMPLEX ANALYSIS Prof. T. Gamelin, Univ.
California (lectures in English)

-FUNCTIONAL ANALYSIS Prof. V. Coti Zelati,
Univ. Napoli (lectures in Italian)

-NUMERICAL ANALYSIS Prof. Prof. R. Jeltsch,
ETH Zurigo (lectures in English)

-DIFFERENTIAL EQUATIONS OF
Prof. A. Donato, Univ. Messina
MATHEMATICAL PHYSICS (lectures in Italian)

-ALGEBRAIC GEOMETRY Lecturer has not yet
confirmed

-DIFFERENTIAL GEOMETRY Prof. F.
Mercuri, Univ. Campinas (lectures in Italian)

-INTRODUCTION TO PROGRAMMING
AND COMPUTER SCIENCE
Prof. R. Irving, Univ. Glasgow (lectures in
English)

-PROBABILITY Prof. P. Billingsley, Univ.
Chicago (lectures in English)

-MATHEMATICAL STATISTICS Prof. B. Flury,
Indiana Univ. (lectures in Italian)

-ALGEBRAIC TOPOLOGY Prof. P. Hilton,
SUNY Binghamton (lectures in English)

**SUMMER COURSE IN MATHEMATICS -
CORTONA 1996**

During Summer 1996 several graduate courses in mathematics will be held, under the sponsorship of the National Research Council and MURST, in Cortona at the Scuola Normale Superiore. The courses will take place during the periods June 30-July 20, 1996, July 21-August 10 and August 11-August 24 1996.

The courses are directed towards young graduates who would like to engage in research in one of the following fields :

June 30 - July 20

-COMPLEX ANALYSIS Prof. E.L. Stout (Univ.
Washington, Seattle) - Prof. M. Abate (Univ.
Ancona)

- MATHEMATICAL MODELS AND INVERSE
PROBLEMS Prof. G. Uhlmann (Univ. Washing-
ton, Seattle) - Prof. I. Galligani (Univ. Bologna)

July 21 - August 10

-ALGEBRA Prof. A. Mann (Hebrew Univ.) - Prof.
A. Caranti (Univ. Trento)

-MATHEMATICAL FINANCE (Lecturers to be
determined)

August 11 - August 24

- DIFFERENTIAL GEOMETRY Prof. M. Micallef (Univ. Warwick) - Prof. D. Alekseevski (Max-Planck-Inst.)

-OPERATIONS RESEARCH - (in cooperation with C.I.R.O.) Prof. R. Cottle (Stanford Univ.) - Prof. L.Wolsey (C.O.R.E.,Belgio)

Each participant is required to choose one topic for a total of 12 hours a week of lectures. In addition, the participants themselves will be asked to participate in the problem sessions and in the seminars that will be organized in the afternoons.

Six fellowships, of the duration of two or three weeks (each consisting of 85.000 Italian lire per week) will be available to foreign participants to help cover their living expenses. The participants will be lodged at no cost in the Palazzone; furthermore breakfast and lunch (the latter only from Monday through Saturday) will be offered by the organization. The School will also provide texts books, lecture notes and photocopies.

NO TRAVEL EXPENSES WILL BE REIMBURSED

Applications should be sent by mail to
Professor Graziano GENTILI

Applications for the courses of the first period should reach this address before April 15, 1996; for the for second and third period before May 15, 1996.

A selection committee will meet shortly afterwards and all foreign applicants will be notified of the result before June 1, 1996.

Applications should contain a BRIEF CURRICULUM VITAE and a DETAILED CURRICULUM STUDIORUM and should indicate which course the candidate would like to follow. Applicants are requested to state if their participations is conditioned by the allotment of a fellowship. The exact address to which all correspondence concerning the Summer courses has to be mailed should be clearly stated.

Information - Programmes and further information can be found on the WEB page of SMI at the address:

<http://www.iaga.fi.cnr.it/SMI/index.html>

or can be obtained by e-mail at:

smi@ds.iaga.fi.cnr.it

Programmes and further information can also be required by fax at n. +39-55-475915 or by mail at the address of the Scuola Matematica Interuniversitaria (see above)

The Chairman of S.M.I.
(Prof. Graziano Gentili) (address above)

UK

University of Cambridge

ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

Director: Sir Michael Atiyah, OM, FRS

20 Clarkson Road, Cambridge, CB3 0EH, U.K. Tel. (01223) 335999 Fax: (01223) 330508
email: i.newton@newton.cam.ac.uk

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10-13 April 1996

CONSTITUTIVE RELATIONS AND THEIR APPLICATION

15 - 19 April 1996

Application forms are available from WWW at

<http://www.newton.cam.ac.uk>

or from Michael Sekulla at the Newton Institute:

email m.sekulla@newton.cam.ac.uk

OTHER CONFERENCES

U.S.A.

First Announcement

NSF-CBMS Conference

Normal surfaces and decision problems in 3-manifolds.

Principal Lecturer: J. Hyam Rubinstein, University of Melbourne.

Dates: Monday, August 5, 1996 - Friday, August 9, 1996

Location: University of California, Davis

PROGRAM: Prof. Rubinstein will give a sequence of ten lectures, two per day. Topics include:

* Normal surface theory * Algorithms and Haken 3-manifolds * Heegaard splittings of 3-manifolds. * Finiteness theorems * Comparing Heegaard splittings * 3-sphere recognition * Higher index almost normal surfaces * Group actions on the

3-sphere * The homeomorphism problem * New directions

Other invited speakers: William H. Jaco (Oklahoma State University) Abigail Thompson (UC Davis)

Funding is available for a limited number of participants. To apply for support write for information to the organizer :

Joel Hass
Department of Mathematics
University of California
Davis CA 95616-8633, USA

Telephone: (916) 752-1082. Email: hass@math.ucdavis.edu

Requests for funding are due on April 1, 1996.

Up-to-date conference information and a downloadable application for funding can be found on the conference webpage:

<http://www.math.ucdavis.edu/~hass/conf.html>

SECOND ANNOUNCEMENT

THE FIRST ANNUAL INTERNATIONAL PRESS LECTURES

University of California, Irvine

March 28 -30, 1996

Three Lectures by CLIFFORD H. TAUBES, (Harvard University)

Title: Seiberg-Witten and Gromov Invariants

Additional Speakers: Sir Michael Atiyah (Cambridge), Yakov Eliashberg (Stanford), Mikio Furuta (RIMS, Kyoto), Robert Gompf (Texas), Peter Kronheimer (Harvard), Dusa McDuff (Stonybrook), Tomasz Mrowka (Cal Tech), Yongbin Ruan (Wisconsin), Zoltan Szabo (Princeton), Shing-Tung Yau (Harvard)

Further Information:

This event is sponsored by International Press and the University of California, Irvine. Organizing Committee: Ron Stern and Richard Wentworth.

All correspondence should be sent to

IP Lectures
Department of Mathematics
University of California, Irvine
Irvine, CA 92717
Phone: (714) 824-5502
E-mail: ipl@math.uci.edu

Problem Corner

Paul Jainta, Werkvolkstr. 10, D-91126 Schwabach, Germany

For reasons beyond our control this article has not been edited in the usual way.

One decade up

A mathematical seedling has grown up into a pretty plant

Quite recently I've spotted a tender plant in the scanty garden of mathematics contests and presented it to a greater audience in this place immediately. The then delicate creature called **Vlaamse Wiskunde Olympiade (VWO)** is now deep-rooted and has craned his neck meanwhile. So it's about time to celebrate a small jubilee. The mathematical plant has grown to an imposing ten-year-old produce from Flanders. I congratulate the cultivators of this home-grown product for seeing this delightful planting through difficult times in the Belgian province. Now that a decade has gone by you can look forward to an active participation of Flanders respective Belgium in the International Mathematical Olympiad (IMO) and other events. We hope for a continual flourishing of VWO under the same inspired organisers !

Best wishes for a second decade !

I'm grateful to **Prof. Paul Igodt** (Katholieke Universiteit Leuven Campus Kortrijk), one of them who scattered the seedcorn VWO ten years ago for forwarding to me a booklet presenting all problems posed at the 9th and 10th *Vlaamse Wiskunde Olympiade* together with an overview of some statistics - from which I'm going to copy further details. Since the Flanders Mathematics Olympiad came into existence more than 70.000 youngsters enrolled in hundreds of Flemish High Schools have participated in a first round each. About 12 per cent of them were selected for the second stage (the AHSME multiple choice test). From this group 70 students on average have met annually for the final test.

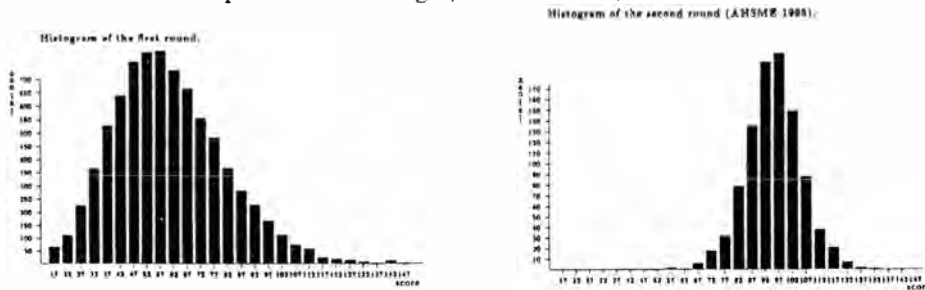
The primary aim for organising this contest was to offer attractive mathematical problems to students as well as teachers. The figures above are illustrating the keenness to make progress with this competition and its problems, which from today's point of view, really are considered as an enrichment to High School mathematics education. Another important goal has been the selection of a team of Dutch-speaking Belgians attending the annual IMO. During the last ten years Belgian IMO-teams scored an increasing success from year to year. So one can say legitimately the competition has stood the test of time and the demand for it has been steady.

The organizers express their gratitude to all who have supported their mission in the attempt to get Flemish students doing mathematics with fun. More particularly their appreciation complies with that universities in Flanders which, on their cooperation, created an attractive and challenging scientific level for the competition. The promoters of VWO are greatly obliged to all members of the jury, who prepared and provided the questions for the first round and the final stage, with utter dedication. Also, they are thankful towards the hundreds of mathematics teachers who are the local driving forces behind VWO in their schools. The responsible architects of this Belgian construction won't forget, too, the friendly concession of the AHSME organizing committee to act as the long arm of their competition in Flanders. Further, they are also indebted to the Minister of Education who was vitally encouraging their initiative for extra training sessions with regard to IMO participation. And finally, the fathers of VWO are owing a debt of gratitude to all private supporters of their organization and the concluding award-ceremony respectively, among other things *The Katholieke Universiteit Leuven Campus Kortrijk, The Limburgs Universitair Centrum, The Universiteit Gent, The Universiteit Antwerpen, The Vrije Universiteit Brussel, The Vlaamse Vereniging Wiskunde Leraars, The Belgisch Wiskundig Genootschap, The Algemene Spaar - en Lijfrente Kas, Texas Instruments N.V., Uitgeverij de Sikkell, Standaard Educatieve Uitgeverij.*

Most of the peculiar things of VWO have been already told but there's something else I wanted to say. From now on it is possible to visit the Executive Secretary of the *Vlaamse Wiskunde Olympiade* via INTERNET. The VWO - homepage can be found at

<http://www.kulak.ac.be/vwo/vwovvww.html>.

And for the sake of completeness we'll present for statistics-lovers two diagrams showing the distribution of scores onto participants of either rounds in 1995. Finally I won't fail to send my warmest good wishes on to all who contribute to the success of VWO. This sort of competition has served well as a model for other European regions, and God bless you for helping to keep mathematics as a basic part of human culture by looking for connections between mathematics and different languages within your own country. May the next ten contests continue to inspire as much thought, debate and interest!



The problems of the *Vlaamse Wiskunde Olympiade* offer always intellectual fare - chewy and digestible food likewise. This shows unchanging sense of mathematical taste since it started. So I have pinched some tough nuts from the table as an appetizer for more habitual food. Now let us turn to the new problems. They are all taken from the final rounds 1993/94 and 1994/95 respectively.

Q 39. Find all solutions (a,b,c) of the equation $(a + \sqrt{c})^2 + (b + \sqrt{c})^2 = 60 + 20\sqrt{c}$ where a,b and c are integers and $c \leq 94$.

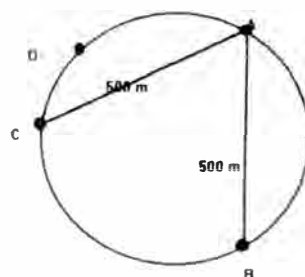
Q 40. Consider the real functions f_n defined by $f_1(x) = x$ and $f_n(x) = \sqrt{f_{n-1}(x)} - \frac{1}{4}$, $(n \in \mathbb{N}, n \geq 2)$.

- (a) Prove that $f_n(x) \leq f_{n-1}(x)$ for all x for which both functions are defined
- (b) For each n , determine all points x in the domain of f_n such that $f_n(x) = x$.

Q 41. Four married couples come together for a game of chess. They draw lots to form four groups of two players each. We know:
 Beatrice plays against Eddy;
 Alice plays against Clara's husband;
 Freddy plays against Guy's wife;
 Doris plays against Alice's husband and
 Guy plays against Eddy's wife.
 Can you conclude with whom Hubert is married? Give a proof of your answer.

Q 42. How many real numbers x , $1 \leq x \leq 3$, satisfy the following condition:
 x^2 and x have the same decimal parts. Give a proof of your answer.

Q 43. Points A, B, C and D lie on the edge of a circular lake with Radius R, as indicated in the figure. The distances between A and C, between A and B both equal 500 meter. The times a swimmer needs to get from D to C, from D to A and from D to B with the same constant velocity are in proportion to 1, 5 and 7. Determine R.



Q 44. 1. Prove that for all $n \in \mathbb{N}$ and for all $\alpha \in]0, \pi[$ the equation is satisfied:

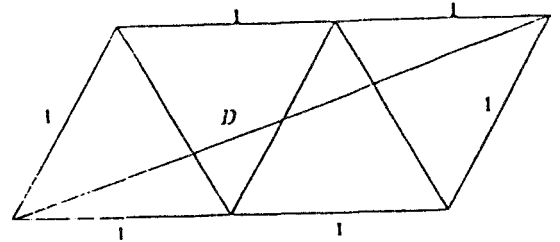
$$\sum_{k=0}^n \sin k\alpha = \frac{\sin \frac{(n+1)\alpha}{2} \sin \frac{n\alpha}{2}}{\sin \frac{\alpha}{2}}$$

2. Let $G(n)$ be the average length of the diagonals of a regular n -gon ($n \geq 4$), inscribed in a circle of radius 1. Compute $\lim_{n \rightarrow +\infty} G(n)$.

In the remaining section we can anticipate lots of solutions to previous questions. Some nice handlings have accumulated. To save space I only will give here solutions to problems presented in the September issue. The other part will be kept for the next Corner. **Roland Johnson**, Zürich, has come up with the unravelling of questions 28 - 33 on his own.

Q28. A given parallelogram consists of four congruent equilateral triangles with sides of length 1 (see figure). Determine the length of diagonal D .

- (A) $\sqrt{5}$ (B) $\sqrt{6}$ (c) $\sqrt{7}$ (D) $\frac{\sqrt{29}}{2}$ (E) 3

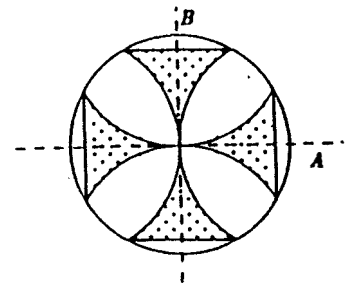


Solution: (c)

We extend the longer sides of the parallelogram to form a rectangle with dimensions

$$2\frac{1}{2} \text{ by } \frac{\sqrt{3}}{2}. \text{ This has a diagonal of length } \sqrt{\left(\frac{5}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2} = \sqrt{7}.$$

Q29. Compute the area of the shaded figure supposing all arcs belong to circles with radius R and A and B are mutually perpendicular axes of symmetry.



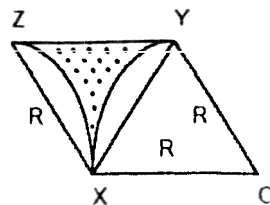
Solution:

One shaded region has area

$$\begin{aligned} & \Delta XYZ - 2(\text{segment on } XY) = \\ & = \Delta XYZ - 2(\text{sector } OXY - \Delta OXY) \\ & = 3 \Delta XYZ - 2 \text{ sector } OXY \\ & = 3 \frac{1}{2} R^2 \frac{\sqrt{3}}{2} - 2 \cdot \frac{1}{2} R^2 \frac{\pi}{3} = \frac{R^2}{12} (9\sqrt{3} - 4\pi). \end{aligned}$$

There are 4 such shaded regions in the figure, so that

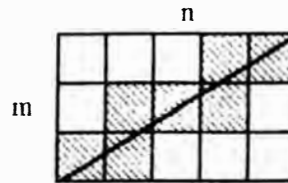
$$\text{the total area is } \frac{R^2}{3} (9\sqrt{3} - 4\pi).$$



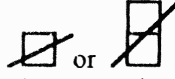
- Q30. A rectangular floor is tiled by squares; there are 1274 tiles arranged in one direction and 990 in the other. If one draws a diagonal line on the floor, how many tiles will be cut? (Only those tiles are counted which are cut by the diagonal in the inner part.)
 (A) 1271 (B) 1274 (C) 1613 (D) 2262 (E) 2264

Solution:

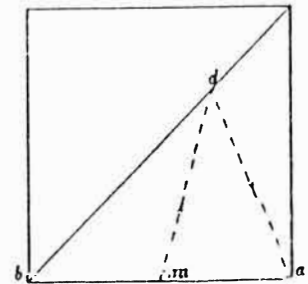
Suppose we have a rectangular region covered by tiles laid in m rows and n columns, where $m < n$ and $\gcd(m, n) = 1$. The diagonal has „gradient“ $\frac{m}{n} < 1$ and



does not pass through any corners except at its endpoints (otherwise, for some $i < n$, $\frac{im}{n}$ is an integer i.e. $n \mid im$, in contradiction to relative primeness). Since the gradient is less than 1, there are only two possibilities for the diagonal to cross one of the co-

lumnns . The only way to move from one row to a neighbouring row is by having an overlap of exactly 1 tile. After the first row we require $(m-1)$ overlaps, so that the total number of tiles crossed is $n + (m-1)$. Now divide the given region into four rectangles of 637×495 tiles; 637 and 495 are relatively prime, so a diagonal crosses $637 + 495 - 1 = 1131$ tiles. The complete diagonal crosses $2 \times 1131 = 2262$ tiles, so the answer is (D). \square

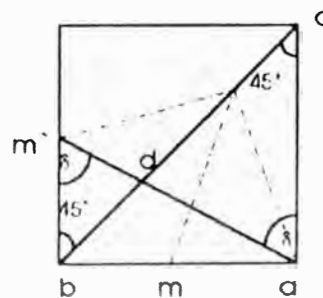
- Q31. In a square with side of length 1 one takes one of the diagonals. From the midpoint m of a side one walks to a point d on the diagonal from where one returns to the endpoint a of the same side (not on the diagonal, see figure) What should be the distance between d and b (the other endpoint of the side), if one wants the sum of the distances $|md| + |da|$ to be a minimum?



Solution:

Reflect m in the diagonal to produce m' . Then $|md| + |da| = |m'd| + |da|$ and this is minimised by placing d on the line am' . Then $\Delta bdm' \sim$

$$\Delta cda \Rightarrow \frac{|bd|}{|cd|} = \frac{|bm'|}{|ca|} \Rightarrow \frac{|bd|}{\sqrt{2} - |bd|} = \frac{1}{2} \Rightarrow |bd| = \frac{\sqrt{2}}{3} \quad \square$$



- Q32. Let n be the natural number consisting of 1991 ones: $n = 111\dots 1$. Prove: n is not a prime number.

Solution:

$1991 = 11 \cdot 181$, so the 1s can be grouped in 181 sets of eleven digits, and n is therefore divisible by the natural number consisting of eleven ones. (The quotient consists of 181 sequences of ten zeros followed by a 1, where the leading zeros in the first sequence will be dropped by convention to give 1 and 180 sequences each of 10 zeros and a 1). \square

Q33. Let ABC be an equilateral triangle. Let X denote a point on side AB different from A and B . One can determine in a unique way points Y and Z such that

- Y lies on $]BC[$
- Z lies on $]AC[$
- the triangle XYZ is equilateral

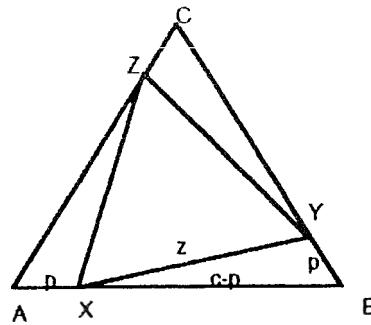
Determine the ratios $|AX| : |XB|$, $|BY| : |YC|$ and $|CZ| : |ZA|$ if you know the area of triangle XYZ is half the area of triangle ABC .

Solution: By symmetry we have $A_{\Delta BXY} = \frac{1}{6} A_{\Delta ABC}$.

$$\Rightarrow \frac{1}{2} p(c-p) \sin B = \frac{1}{6} \cdot \frac{1}{2} c^2 \sin B \Rightarrow 6p(c-p) = c^2 \Rightarrow$$

$$6p^2 - 6pc + c^2 = 0 \Leftrightarrow p = \frac{6c \pm \sqrt{36c^2 - 24c^2}}{2 \cdot 6} = \frac{c}{6} (3 \pm \sqrt{3}).$$

And by symmetry again, these solutions represent the two possibilities for p and $c-p \Rightarrow |AX| : |XB| = (3 - \sqrt{3}) : (3 + \sqrt{3})$ or vice versa. □



Editor's note. One reader, **Maurice Brémond**, Avignon, has pointed out a misprint on page 34 of the Problem Corner no. 18 (December 1995), for which we apologize. In the last fraction but one appearing in the solution of Q 17 the numerator should read $4 \cdot S$ instead of $4 \cdot S^2$. Furthermore M. Brémond has given his backing to *Al Kaschi* and *Thales* and he takes their part against my insolent assessment of the results used to be exotic while solving Q 17.

He writes: *A mon avis, Al Kaschi et Thalès ne sont pas plus exotiques que Pythagore; ce qui peut, par contre, paraître un peu insolite, c'est l'emploi un peu intense des rapports égaux qu'un conditionnement quasi universel ne fait d'ordinaire employer que pour les sempiternels partages proportionnels !*

That completes our file of solutions from the Corner and the space for this issue.

Finally, propose problems for which readers will send in solutions. Proposals should, whenever possible, be accompanied by a solution, references, and other insights which are likely to be of help for the editor. They can be anything from elementary to advanced, from easy to difficult. Original problems are particularly sought. So, please submit any interesting problems you came across, especially those from (problem) books and contests that are not easily accessible. But other interesting problems may also be acceptable provided they are not too well known and references are given as to their provenance. I hereby invite my readers to share them with their colleagues and students.

I welcome your input, and especially problem sets and solutions for use !

Paul Jainta, Werkvolkstr. 10, D-91126 Schwabach

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Already a regular event in the USA, Springer-Verlag is now holding its first international Yellow Sale. This will be available in all countries except Germany, Austria, Switzerland and North and South America.

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D-14197 Berlin, GERMANY
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e-mail: orders@springer.de

Alternatively, the Yellow Sale catalogue may also be downloaded by ftp: ftp.springer.de directory: /pub/yellowsale

Complete details of the Yellow Sale are also available via the World Wide Web, where you will find more detailed information on each of the titles offered:

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Sale price: DM 49; 23; FF 185

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BRIEF REVIEWS

Edited by Ivan Netuka and Vladimír Souček. Books submitted for review should be sent to the following address: Ivan Netuka, MÚUK, Sokolovská 83, 186 00 Praha 8, Czech Republic.

C.Moeglin, J.L.Waldspurger: Spectral Decomposition and Eisenstein Series, Cambridge Tracts in Mathematics, vol.113, Cambridge University Press, Cambridge, 1995, xxvii+338 pp., GBP 50.00, ISBN 0-521-41893-3

Automorphic forms on reductive groups are at the centre of contemporary number theory and representation theory. The book under review treats one of the foundational aspects of analytic theory of automorphic forms – the decomposition of the space $L^2(G(\mathbf{Q})\backslash G(\mathbf{A}))$ for a reductive group G over \mathbf{Q} and its central extension \mathbf{G} (as well as a function-field version). The authors aim was to present a detailed contemporary treatment of Langland's theory of Eisenstein series and its applications to the above decomposition. They cover a lot of background material on general theory of automorphic forms to make the book reasonably self-contained. The result is a superb introduction to analytic theory of automorphic forms, heartily recommended to all graduate students and researchers involved in Langland's program. (jnek)

K.Gödel: Collected Works. Volume III. Unpublished Essays and Lectures. Edited by S.Feferman, London Mathematical Society Lecture Note Series, vol.222, Oxford University Press, Oxford, 1995, xvii+532 pp., GBP 45.00, ISBN 0-195-07255-3

This book is the third part of the series devoted to Kurt Gödel's works. It concerns unpublished essays and lectures. Elaborations on the material was provided by a group led by Solomon Feferman, as in the two previous volumes. This third volume has the same structure as the previous ones. Every part begins with notes on the theme, followed by original work (on one side in German and the English translation on the other side - when written in German). The book finishes with a rich list of references. The book (together with the previous two volumes) is a wonderful source of information concerning the work of Kurt Gödel - an outstanding logician of our century. It is very good that the members of the editorial group have found enough time and energy to create this work. (čuk)

A.A.Kirilov (Ed.): Representation Theory and Noncommutative Harmonic Analysis I, Encyclopaedia of Mathematical Sciences, vol.22, Springer-Verlag, Berlin, 1994, 234 pp., 11 fig., DM 148.00, ISBN 0-387-18698-0, ISBN 3-540-18698-0

This volume of the Encyclopaedia is in two parts. The first one (written by A.A.Kirillov) is a very nice overview of basic facts from representation theory. The second part (prepared by Yu.A.Neretin) describes one of important recent topics in representation theory - representations of certain infinite-dimensional Lie algebras. There are many expositions of various classical parts of representation theory available, nevertheless Kirillov's review is exceptional. Following a long tradition, the exposition is very economical and

condensed. The most important features can be clearly seen without being buried in many details. Proofs of many theorems are outlined, their main points are stressed and details can be (with some effort) reconstructed. A short account of the history of harmonic analysis at the beginning gives an important general orientation in the subject. The main topics discussed are the theory of representations of finite groups, finite-dimensional representations of Lie groups, infinite-dimensional unitary representations. The last long chapter describes the orbit method in representation theory. The second part treats representations of Virasoro and affine Lie algebras. This is a very important new topic inspired by theoretical physics. The field is far from being finished and the author covers the different approaches that presently exist. Several important constructions of such representations are discussed in the main text, there are also appendices describing some complementary facts. The theory of characters and applications to the theory of integrable systems are not discussed here. The book is very valuable and can be warmly recommended to interested audience. (vs)

M.Senechal: Quasicrystals and Geometry, Cambridge University Press, Cambridge, 1995, xv+286 pp., GBP 40.00, ISBN 0-521-37259-3

This is the first book giving a self contained exposition of this new and fascinating subject. It is directed both to mathematicians and physicists working in the field - or to those merely having an interest in the subject. The mathematical prerequisites needed to understand the book are reduced to a minimum, making it accessible also to nonspecialists. The book covers a wide range of subjects, starting with a nice historical introduction, continuing with the exposition of lattices, Voronoi cells, explaining the projection method of construction of quasicrystals, and giving a comprehensive treatment of the elements of diffraction geometry. Further there is a chapter on one-dimensional problems, a chapter on basic concepts of tiling theory, a chapter on Penrose tilings (including the matching rules, pentagrids and projection method). Then the chapter "Aperiodic Zoo" gives another examples of quasiperiodicity. The book ends with a collection of useful computer programs (to generate various quasiperiodic tilings) and with an appendix containing some mathematical supplements (for less experienced readers). To summarize, this is a nice, timely and valuable book and is recommended to anybody interested in learning about this subject. (mz)

M.P. do Carmo: Differential Forms and Applications, Universitext, Springer-Verlag, Berlin, 1994, vii+118 pp., 18 fig., DM 48.00, ISBN 3-540-57618-5, ISBN 0-387-57618-5

This is an excellent short course on differential forms and Stokes theorem, including some of their important applications. Basic notions (differential manifolds

with boundary, differential forms and their integration, de Rham cohomology) are introduced in the first 75 pages. The exposition is short, clear and very readable, numerous interesting exercises and examples are attached to every chapter, there are enough pictures to help the imagination to understand the notions described. The second part of the book treats the differential geometry of surfaces. E. Cartan's method of moving frames is introduced and used for the description of immersed surfaces and the intrinsic geometry of surfaces. The final chapter presents a proof, due to S.S. Chern, of the Gauss-Bonnet theorem for compact surfaces. It is a pleasure to read the book. It can be warmly recommended to students willing to learn the subject as well as to teachers as a text book for their lectures. (vs)

I.Vaisman: Lectures on the Geometry of Poisson Manifolds, Progress in Mathematics, vol.118, Birkhäuser Verlag, Basel, 1994, vi+205 pp., sFr 78.00, ISBN 3-764-35016-4, ISBN 0-817-65016-4

The book is devoted to the study of properties of Poisson manifolds, i.e. manifolds with a distinguished space of functions endowed with the structure of Poisson algebra. To read the book, a certain amount of knowledge about the theory of symplectic manifolds is necessary. The book begins with a definition of the Schouten-Nijenhuis bracket, a description of its properties, the Koszul formula for generalized divergence and its applications. The main part of the book describes the theory of Poisson manifolds. It includes a description of the symplectic foliation, a study of the differential calculus of forms, Poisson cohomology and homology, and an introduction to quantization of Poisson manifolds. An action of a Lie group on a Poisson manifold (an extension of the action in symplectic geometry) is studied, several realizations of Poisson manifolds as local symplectic realization, isotropic realizations and realizations by symplectic groupoids are described. At the end of the book, Poisson-Lie groups are introduced and their Lie algebras are studied. The role of solutions of the important Yang-Baxter equations on Lie algebras in constructions of Poisson structures is discussed. Moreover, a brief introduction to the actions of Poisson-Lie group on Poisson manifold is given there. Many examples and interesting comments make the book very readable. The book is a nice introduction into the theory of Poisson structures and can be recommended to mathematicians as well as to physicists interested in the topic. (jbu)

G.M.Khenkin (Ed.): Several Complex Variables V. Complex Analysis in Partial Differential Equations and Mathematical Physics, Encyclopaedia of Mathematical Sciences, vol.54, Springer-Verlag, Berlin, 1993, 286 pp., DM 144.00, ISBN 3-540-54451-8, ISBN 0-387-54451-8

There are three parts to this volume, which all describe certain subfields of complex analysis. The first one (the authors are C.A.Berenstein and D.C.Struppa) contains a discussion of certain important problems of the theory of partial differential equations (or convolution equations, in general). The key result is the Ehrenpreis-Palamodov Fundamental Principle which provides a

Fourier integral representation for solutions of linear PDEs with constant coefficients and its generalizations to the case of convolution equations. The last two chapters discuss the role of multidimensional residues in the theory and some topics from Algebraic Analysis created by Sato, Kashiwara and Kawai. There is a very valuable and comprehensive bibliography. The second part (G.M.Khenkin, R.G.Novikov) presents various forms of the Radon-Penrose transform which expresses Yang-Mills fields on complexified Minkowski space in terms of holomorphic data on the space of complex null lines (the ambitwistor space). The authors discuss also a connection with the Faddeev-type scattering data and an interpretation of Yang-Mills fields as a compatibility condition for suitable linear equations. The classical Penrose transform on the twistor space (i.e. on the set of the so called α -planes) is not discussed here. The last part considers basic mathematical results developed in connection with string theory - a recent hot topic of particle physics. To compute vacuum expectation values in string theory, it is necessary to understand determinants of Cauchy-Riemann operators moduli spaces of Riemann surfaces (i.e. Teichmüller spaces), to calculate the Mumford measure and its expression in terms of theta-functions. The relevant results are discussed here in the case of the theory of closed strings (superstrings are not considered). As usual, the book brings an overview and explanation of results, not their proofs. The book can be very much recommended as a source of condensed information on the topics discussed and would be very useful for anybody interested in the subject. (vs)

A.Etheridge (Ed.): Stochastic Partial Differential Equations, London Mathematical Society Lecture Note Series, vol.216, Cambridge University Press, Cambridge, 1995, x+337 pp., GBP 24.95, ISBN 0-521-48319-0

The proceedings under review comprise 19 articles contributed by the participants of a workshop on stochastic partial differential equations (SPDE's) that was held at the University of Edinburgh in March 1994. SPDE's seem to be still generally viewed as a rather exclusive topic, but these proceedings, addressing many less traditional models, show that they appear quite naturally in many problems of mathematical or physical origin. The mainstream of today's theory of SPDE's is represented largely by papers on measure-valued processes arising in the study of branching particle systems of diffusions; one can find, however, also papers on numerical experiments with SPDE's, nonstandard analysis methods, or on ergodic behaviour of Markov processes via logarithmic Sobolev inequalities. Approximately a half of the contributions are full-length papers containing proofs, while the others ones aim at surveying their authors' recent achievements in a "non-technical" way. (jis)

Lung-an Ying: Infinite Element Methods, Friedrich Vieweg & Sohn, Wiesbaden, 1995, 209 pp., DM 88.00, ISBN 3-528-06610-5, ISBN 7-301-02781-8

The first author's book on the infinite element method was published in Chinese by Peking University Press

in 1992 and contained results obtained before 1989. In this present English version many supplements to the Chinese edition have been included. The book begins with a chapter on the algorithm of the infinite element method. To read this part one only needs a knowledge of calculus and matrix operations. The simplest illustrative example is the solution of the Dirichlet problem in the exterior of a polygon. The exterior is subdivided into annular regions by a sequence of geometrically expanding images of the given polygon and these annuli are then further subdivided. The resulting variation equations take the form of a block tridiagonal Toeplitz matrix. Various efficient methods are described for solving such systems of equations. The following discussions are devoted to the infinite element method for the three dimensional exterior problems of the Laplace equation, corner problems, the problem of plane strain, exterior Stokes problems, boundary value problems for the biharmonic equation, the Helmholtz equation, elliptic equations with variable coefficients, parabolic equations and variational inequalities. Some examples showing the effect of the infinite element method are collected in Chapter 4. Convergence theorems are presented in Chapter 3, and to read this chapter one needs further knowledge (e.g. Kato's perturbation theory for linear operators). The author proves that the rate of convergence of the infinite element method for singular solutions is the same as that of the finite element method for smooth solutions, sometimes even higher. Applying Kato's perturbation theory, the author's results show that the infinite element method is a natural approach for solving singularities. The infinite element method is, wherever applicable, an elegant and efficient approach for solving problems in physics and engineering. The book makes it available to the community of numerical analysts and computational scientists. (kn)

P. Straffin (Ed.): Applications of Calculus. Resources for Calculus Collection, volume 3, MAA Notes and Report Series, Number 29, The Mathematical Association of America, Washington, D.C., 1993, xiv+262 pp., ISBN 0-883-85085-0

This volume of the MAA Notes is a collection of 18 examples of applications of calculus. The applications are very diverse, a reader can find applications from economics, physics, medicine, computer science etc. Each module starts with a concrete problem and develops a solution to the problem based on the ideas of calculus. The book contains a curriculum of calculus annotated with an indication where particular application modules can be used. Information on the prerequisites is provided at the beginning of each module, too. The text of each module is not only a development of solutions of problems, but exercises are also included. At the end of each module the solutions of these exercises can be found. Each module contains references. The applications discussed in the book are not easy and they require a lot of time to be presented. However, it is very desirable to show students that calculus is very useful. Therefore the book is recommended to all teachers of calculus. (ml)

P. Plaschko, K. Brod: Nichtlineare Dynamik,

Bifurkation und Chaotische Systeme, Angewandte Mathematik, Friedrich Vieweg & Sohn, Braunschweig, 1995, viii+232 pp., DM 38.00, ISBN 3-528-06560-5

This book is an introduction to the qualitative theory of ordinary differential equations and can be used as a textbook for the first graduate course on the subject. The main ideas (like centre manifolds, normal forms, structural stability, local and global bifurcations) are presented briefly without proofs but they are demonstrated on well chosen illustrative examples. The choice of material is similar to the book of S. Wiggins, *Introduction to Applied Nonlinear Dynamical Systems and Chaos* (Springer 1990) which is more advanced. (jmil)

Sun-Joo Shin: The Logical Status of Diagrams, Cambridge University Press, Cambridge, 1995, xi+197 pp., GBP 24.95, ISBN 0-521-46157-X

In this book the author investigates Venn diagrams and similar topics. A formal mathematical theory is created from this. Syntax and semantics are introduced and completeness is proved (the semantical inference \models and the syntactical inference \vdash are proved to be equivalent). This work is done in order to raise this branch of mathematics to a correct mathematical theory. (The results of which need not be justified using first order logic.) The great advantage of visual representation is stressed. The equivalence with first order monadic logic is proved. But some disadvantages are mentioned and discussed, too. The history is described and related literature is referred to. In the whole book I was unable to find a note about the basic disadvantage of this branch - the geometrical restrictions. All the examples in the book use at most three closed curves (having convex interior). For this reason I still prefer first order logic. (čuk)

A. Katok, B. Hasselblatt: Introduction to the Modern Theory of Dynamical Systems, Encyclopedia of mathematics and its applications, vol. 54, Cambridge University Press, Cambridge, 1995, xviii+802 pp., GBP 60.00, ISBN 0-521-34187-6

The theory of dynamical systems is a core part of current mathematical research and has many applications to physics, biology, economics, etc. This book is much more a monograph than an introduction to finite dimensional (mainly differentiable) dynamics since it contains detailed discussion of very different topics (e.g. hyperbolicity, ergodic theory, low dimensional dynamics (interval, circle), entropies, Hamiltonian systems) and presents many recent results. The well written notes outline the history and further development and give guidelines through more than 300 references. The text is carefully written and is accompanied by many exercises which are mostly nontrivial. The appendix of the book contains basic notions and results from topology, functional analysis, differential geometry and measure theory. There are other sources of information on the subject, mainly the Russian surveys "Dynamical Systems" translated into English in the Springer series "Encyclopaedia of Mathematical Sciences". These surveys can be recommended for quick orientation and the book under review for a deeper insight. (jmil)

H.Grauert, T.Peternell, R.Remmert (Eds.): Several Complex Variables VII. Sheaf-Theoretical Methods in Complex Analysis, Encyclopaedia of Mathematical Sciences, vol.74, Springer-Verlag, Berlin, 1994, 369 pp., DM 144.00, ISBN 3-540-56259-1, ISBN 0-387-56259-1

This volume of the Encyclopaedia, devoted to the theory of complex spaces, is written by H.Grauert, R.Remmert and Th.Peternell together with G.Dethloff and F.Campana. It describes carefully and systematically the main topics in this part of the theory of several complex variables. It begins with the local theory of complex spaces and differential calculus. Then it treats cohomology groups with coefficients in sheaves. Stein spaces are discussed together with a concept of q -convexity and q -concavity, including a discussion of negative and positive holomorphic vector bundles on such spaces and Serre duality. The notions of analytic and meromorphic decomposition of complex spaces is described as well as proper modifications (i.e. generalizations of blow-ups). The book finishes with a description of cycle spaces (the Douady space and the Barlet space) and the theory of extensions of analytic objects. At some places, historical notes are added, and the bibliography is organized by chapters. There is no doubt that such a well organized survey of the important part of contemporary mathematics written by leading experts in the field should belong to the library of anybody interested in the field. (vs)

J.-Y.Girard, Y.Lafont, L.Regnier (Eds.): Advances in Linear Logic, London Mathematical Society Lecture Note Series, vol.222, Cambridge University Press, Cambridge, 1995, vi+389 pp., ISBN 0-521-55961-8

The book is related to the first international meeting on linear logic held at Cornell University in June 1993. Linear logic was introduced by J.-Y.Girard as a resource-sensitive refinement of classical logic. Hence it contains classical logic as its "not very interesting" part. This refinement has as its consequence the rise of a rich (but complex) apparatus. This new apparatus is a challenge for the investigations of new aspects, but also to the adaptation of known ideas to this new situation (e.g. linear λ -calculus) or to other refinements (bilinear logic, noncommutative linear logic). The book begins with an introductory part describing the foundations of linear logic (written in a very nice manner by J.-Y.Girard). Five parts follow containing contributions concerning similar areas. Let us mention here some of the areas being discussed: linguistics, proof nets and interaction nets, Minski machines, but also stochastic interaction, complexity theory and set theory, Hilbert space and geometry of interaction. (čuk)

J.McCleary: Geometry from a Differential Viewpoint, Cambridge University Press, Cambridge, 1994, xii+308 pp., GBP 14.95, ISBN 0-521-41430-X, ISBN 0-521-42480-1

The book provides an excellent survey of most of the content, as well as methods accumulated under the notion of geometry, up until the beginning of the current century. Assuming only high school geometry and the

basics of analysis as a prerequisite, the author guides the reader through the history of the development of geometrical knowledge from Euclid until Levi-Civita and his contemporaries. The entire work consists of three essential parts or, as the author would put it, composed in a sonata form of three movements. The first part (A: *Prelude and Themes*) is, at least in my opinion, a masterpiece of an introduction to hyperbolic geometry. Without much axiomatic ado, but still by a rigorous way, the author leads the student from Euclid's fifth postulate and its negation to the trigonometry of the hyperbolic (or Lobachevskian) space within no more than 50 pages. Almost all the notions of modern differential geometry are explained in the second part (B: *Development*). The build up of the theory is closely related to the historical development with the special attention to the impulses given to this development by real-life practice (for the last, see the digression at the end of the chapter 6, or the chapter 8^{bis} on map projections). The study of topics like the central projection, metric equivalence of surfaces, geodesics and surfaces of a constant curvature pave the way to the finale of the sonata. The third part (C: *Recapitulation and coda*) introduces the models for hyperbolic plane: the Beltrami disk, the Poincaré disk and the Poincaré half-plane. In the last model many interesting properties of the hyperbolic plane are demonstrated. The last chapter of part C (called *Epilog*) outlines some of the more advanced topics of differential geometry (differentiable manifolds and their differentiable transformations, vector and tensor fields and related topics). The book is directed towards undergraduate university students to enable them to grasp the sense and meaning of contemporary geometry, as well as to become familiar with its seemingly too sophisticated tools and formalism. It will certainly serve this purpose very well. (jtro)

K.Harris, R.J.Lopez: Discovering Calculus with Maple. Second Edition, J.Wiley & Sons, Inc., New York, 1995, 344 pp., GBP 15.45, ISBN 0-471-00973-3

This book is not a calculus textbook. Its aim is to help students to understand and apply the ideas of calculus. The computer algebra system Maple is used for this purpose. But the use of the book does not require readers who are already familiar with Maple. To help Maple beginners the first chapter is devoted to an introduction to this computer algebra system. The contents of the book correspond to a traditional calculus course. The structure of chapters follows the same format. Firstly, a list of new Maple commands is presented. Each command is briefly explained. The main section of each chapter is a set of solved problems. Finally, sections Exercises and Projects are included. The section Exercises contains problems which are not very difficult, Projects are more challenging. The solutions of Exercises and Projects are not given. The book contains an index, but the choice of items is not optimal. The book is nicely written and recommended to everybody. (ml)

W.S.Anglin: Mathematics: A Concise History and Philosophy, Undergraduate Texts in Mathematics. Readings in Mathematics, Springer-Verlag, New York, 1994, xi+261 pp., 15 fig., DM 68.00, ISBN 3-540-

94280-7, ISBN 0-387-94280-7

This is a well written and useful textbook for an introductory one-semester course in the history and philosophy of mathematics. It contains *many detailed explanations of important mathematical procedures actually used by famous mathematicians* and gives an opportunity to learn the history and philosophy by way of problem solving. In 40 short chapters, various kinds of interesting mathematical topics are discussed (from ancient to 20th century: unit fractions, pythagorean mathematics, figurative numbers, five regular solids, golden ratio, diophantine equations, Fibonacci numbers, cubic equations, four square theorem, Cantor's set theory, etc.). The reader will find in the book also basic information about great mathematicians. The book includes bibliographical references (26 titles) and an index. In Appendix A, there are sample assignments and tests (15 pp.); answers to selected exercises (11 pp.) are found in Appendix B. The book can be warmly recommended both to secondary and high school mathematics teachers as well as to students and to everyone interested in the history of mathematics. (jbe)

A.C.McBride, G.F.Roach (Eds.): Recent Developments in Evolution Equations, Pitman Research Notes in Mathematics Series, vol.324, Longman Scientific & Technical, Harlow, 1995, 251 pp., GBP 32.00, ISBN 0-582-24669-5

These proceedings of the conference held in Strathclyde in 1994 collect 4 plenary lectures and 24 contributions. Plenary lectures were delivered by J.Goldstein, G.Shi (Obstacle scattering for elastic waves), Y.Saito (Radiation condition method in spectral and scattering theory), N.Sauer (Implicit evolution equations and empathy theory), G.Webb (Periodic and chaotic behavior in structured models of cell population dynamics). The main attention in the contributions is devoted to various aspects of linear and nonlinear semigroups and their applications to evolution equations. Several of them deal with concrete physical models, like gas dynamics. (jml)

J.-P.Pier (Ed.): Development of Mathematics 1900-1950, Birkhäuser, Basel, 1994, xvii+729 pp., DM 118, ISBN 3-764-32821-5, ISBN 0-817-62821-5

In 1992 the Luxembourgian Mathematical Society organized a conference where eleven invited lecturers described developments in their subjects during the first half of the century. The length of contributions varies a lot. The introductory part presents a year-by-year review of the most important achievements in the period 1900-1950, prepared by a collective of mathematicians. Longer papers by J.Diedonné (topology), M.Guillaume (mathematical logic), J.-P.Pier (integration and measure theory) and W.Schwarz (evolution of prime number theorem) describe the evolution of ideas in these respective areas. Shorter ones are written by J.L.Doob (Kolmogoroff's role in probability theory), G.Fichera (Volterra's contributions to functional analysis), W.K.Hayman (function theory), Ch.Houzel (prehistory of Weil's conjectures), J.-P.Kahane (Brownian motion and probability theory), A.Lichnerowicz (geometrie and relativity), J.Mawhin (boundary value problems in

ordinary differential equations) and L.Nirenberg (partial differential equations). The book ends with a comprehensive bibliography (almost 100 pages), register and a few photos. (jfo)

P.J.Davis, R.Hersh, E.A.Marchisotto: The Mathematical Experience. Study Edition, Birkhäuser, Boston, 1995, xxi+487 pp., DM 78.00, ISBN 0-817-63739-7, ISBN 3-764-33739-7

This is the second edition of the book originally published in 1981, also by Birkhäuser. In the introduction written for the first edition by Gian-Carlo Rota, we read: "Making mathematics accessible to the educated layman, while keeping high scientific standards, has always been considered a treacherous navigation between Scylla of professional contempt and the Charybdis of public misunderstanding. Davis and Hersh have sailed across the Strait under full sail. They have opened a discussion of the mathematical experience that is inevitable for survival." The book contains eight sections called, e.g., Selected Topics in Mathematics, Teaching and Learning, Mathematical Reality. These sections contain short articles on different subjects. Each section is accompanied by "Assignments and Problem Sets" in which there is a list of Topics to Explore, Essay Assignments, Problems and Suggested Readings and which contain a lot of material. Some subjects were previously treated by one of the authors (sometimes with co-author(s)) in Scientific American or a publication of the sort. While for a mathematician it is interesting to compare authors opinion about mathematical objects, discoveries, fields e.t.c., for a layman it is a unique chance to visit the world of mathematics. The book can be used in seminars for non-math students of Universities or teachers of mathematics at secondary schools. (jv)

R.G.Pinsky: Positive Harmonic Functions and Diffusion. An Integrated Analytic and Probabilistic Approach, Cambridge Studies in Advanced Mathematics, vol. 45, Cambridge University Press, Cambridge, 1995, xvi+474 pp., GBP 50.00, ISBN 0-521-47014-5

This extensive book (470 pages) studies the interplay between probability theory (martingales, Markov processes, stopping times etc.) and the analytical methods in the theory of positive harmonic functions for second order elliptic operators. The book is intended not only for probabilists but also for analysts willing to learn more about the probabilistic side of the subject (which enlightens many aspects of the classical theory of harmonic functions). The book is reasonably self contained, accessible even to a graduate student but maintaining a high level of mathematical rigor. In comparison with existing books on the subject (for example Doob's Classical Potential Theory and its Probabilistic Counterpart, Springer 1984), the present book contains a further related results including the newest developments in the field. The richness of the material treated by this book can be illustrated by the following sample: the basic properties of diffusion processes; the spectral theory of elliptic operators on various types of domains; applications to the one-dimensional case and the radially symmetric multi-dimensional case; criteria for transience or recurrence

Robert D. Ryan and extensively updated by both Cohen and Ryan. The authors study the existing relations between filter banks and wavelet decompositions and show how these relations can be exploited in the context of digital signal processing. The book begins with a chapter on the concept of multiresolution analysis in the continuous and the discrete case. Complete proofs of the basic results are presented. The description of conjugate quadrature filters that are associated with localized multiresolution analysis are given in Chapter 2. Chapter 3 is devoted to a study of regularity of wavelets by using properties of their associated conjugate filters. An important generalization is developed in Chapter 4. Biorthogonal wavelet bases are introduced and the concepts and methods in the preceding chapters are extended to this case. Chapter 5 is devoted to multiresolution analysis of stochastic processes in connection with signal and image compression. The authors include further mathematical development of material selected from the first four chapters in three appendices. (kn)

B.Choudhary: The Elements of Complex Analysis. Second Edition, J.Wiley & Sons, Inc., New York, 1992, xii+333 pp., \$ 32.95, ISBN 0-470-22116-X, ISBN 8-122-40399-9

The book is interesting but it would be better to describe it in a longer review. In fourteen chapters (and two appendices), standard topics of the basic parts of complex analysis are discussed. Moreover, Chapter 10 includes some physical applications and Chapter 13 discusses certain topics from theory of differential equations. There are many examples and about 275 mostly very interesting exercises (71 of them with solutions presented at the end of the book). But there are misprints and many inexact formulations (to give an example, the notion "non-isolated essential singularity" on p. 107 is not defined). To summarize, the book can be recommended to everybody but for careful reading only. (bn)

V.Havin, B.Jöricke: The Uncertainty Principle in Harmonic Analysis, Ergebnisse der Math.und ihrer Grenzgebiete 3.Folge. A Series of Modern Surveys in Math., vol.28, Springer-Verlag, Berlin, 1994, vii+543 pp., 45 fig., DM 188.00, ISBN 3-540-56991-X, ISBN 0-387-56991-X

The book consists of two parts. The first and shorter one is entitled 'The Uncertainty Principle Without Complex Variables' (approx. 100 pages) and the second one 'Complex Methods' (approx. 400 pages). The authors present the book as a collection of variations on the theme: It is impossible for a non-zero function and its Fourier transform to be simultaneously very small. The first part contains a thorough discussion of the F. and M. Riesz theorem (with various proofs and generalizations), the Ivashev - Musatov theorem giving the necessary condition being zero on a charge

which is singular with a finite l^2 norm of its Fourier transform and some functional analytic approach to the Uncertainty Principle problem. The second part starts with a complex view of the Uncertainty Principle. The considerations are based on the fact that a function of a real variable with bounded spectrum coincides on \mathbf{R} with an entire function of a complex variable. If the spectrum of a function is semibounded then this function can be analytically extended to the upper (or lower) complex halfplane. The introductory chapter of the second part of the book is concluded by some information on the Cartwright class of entire functions which includes the Fourier image of any charge with compact support. The further considerations are split into two cases when the logarithmic integral converges or diverges. Missing frequencies and the diameter of the support are studied in the next chapter together with the Beurling - Malliavin theorem and the Fabry theorem. The final chapter of the second part of the book is devoted to the study of local and non-local convolution operators. The present book is a very good advanced textbook in Fourier analysis and can be helpful also for experts. (ss)

R.M.Smullyan: Diagonalization and Self-Reference, Oxford Logic Guides, vol.19, Oxford University Press, Oxford, 1994, xv+396 pp., ISBN 0-19-853450-7

Self-reference, diagonalization and fixed points play a substantial role in Gödel's incompleteness proofs, recursion theory, combinatoric logic, semantics and metamathematics; the main purpose of this book is to give a unification of fixed points in these areas. In Chapters 12-20, one such is presented; it is based on abstract structures called sequential systems. Its generalization, connected with problems of fixed points in combinatory logic, which is studied in more detail in Chapters 17-19, is formulated in the last chapter. A motivation of the subject (for non-experts, of course), can be found in Chapters 5-8, and the first three can be viewed as an elementary introduction with interesting examples and formulations. Moreover, Chapters 6-8 present a concept of recursion theory based on the notion of elementary formal systems. In Chapter 9, Peano arithmetic is discussed in this spirit and in Chapters 10 and 11 some generalizations of many of the results for recursion theory are established. This interesting book is intended for beginners and experts alike. A knowledge of mathematical logic is needed for reading the Chapters 5 ("Self-reference in arithmetic") and 9 only. (jm)

Note. *The last two reviews have already appeared in the Newsletter. Unfortunately, the former was published in No. 18 without the names of the authors, the latter in No. 17 with wrong heading. We apologize to our readers for these unfortunate errors. Thank you for your understanding.*

and explosion or non-explosion of diffusion processes; positive harmonic functions, the Martin boundary and its applications; bounded harmonic functions and applications to Brownian motion, the Laplacian on a manifold of non-positive curvature. Exercises, historical notes and references follow each chapter of the book. This book will undoubtedly become the standard reference text for those teaching the subject and also for the researchers in the field. (mz)

G.Frei, U.Stammbach: *Die Mathematiker an den Zürcher Hochschulen*, Birkhäuser Verlag, Basel, 1994, 86 pp., sFr 14.80, ISBN 3-764-35078-4

The small booklet under review describes the development of mathematics at the Zürich universities with special emphasis on their mathematical personalities. The university at Zürich was created quite late (in 1833) from protestant, theological collegium Carolinum which was formed by Zwingli in 1523. The Zürich' Technical University was founded in 1855. The main part of the book consists of biographical data of professors at these universities. The life at the University in the period 1855-1950 is described first in biographies of 25 mathematicians (including Clausius, Zermel, Fueter, Finsler, Ahlfors, Nevanlinna and van der Warden). The same period at the Technical University is illustrated by lives of 48 mathematicians, including Dedekind, Christoffel, Frobenius, Hurwitz, Minkowski, Weyl, Plancherel, Pólya, Hopf, Borel, Weinberg and Chandrasekharan. The book begins with a reminiscence of the first International Mathematical Congress and the Congress in 1932. It includes a short bibliography concerning the history of both institutions and a list of the archive materials used (including pictures of some of the personalities described). (jfo)

C.Bandle, J.Bemelmans, M.Chipot, J.S.J.Paulin, I.Shafrir (Eds.): *Elliptic and Parabolic Problems. Pont-a-Mousson 1994*, Pitman Research Notes in Mathematics Series, vol.325, Longman Scientific & Technical, Harlow, 1995, 263 pp., GBP 33.00, ISBN 0-582-23961-3

This volume collects 23 contributions given during the second European Conference on Elliptic and Parabolic Problems which was held at Pont-a-Mousson in 1994. These proceedings offer a good picture of the current state of research not only in the theoretical context with calculus of variations but also in various applications, mainly to mechanics. Several lectures include also a discussion of numerical aspects and simulations on computers. (jml)

M.Sharir, P.K.Agarwal: *Davenport-Schinzel Sequences and Their Geometric Applications*, Cambridge University Press, Cambridge, 1995, xii+372 pp., GBP 40.00, ISBN 0-521-47025-0

Let n, s be positive integers. A sequence u_1, \dots, u_m of positive integers is called an (n, s) Davenport-Schinzel sequence if it contains no pair of equal adjacent elements and there do not exist $s + 2$ indices $1 \leq i_1 < i_2 < \dots < i_{s+2}$ such that $u_{i_1} = u_{i_3} = u_{i_5} = \dots = a$, $u_{i_2} = u_{i_4} = u_{i_6} = \dots = b$ and $a \neq b$. This somewhat technical notion arises in the analysis of the combinatorial complexity of the lower envelope of

functions (say, of polynomials of degree $\leq s$) and thus presents a basic and important tool in many geometric applications, both combinatorial and algorithmic. A non trivial tool, as they possess the surprising property that their maximum length is almost linear in the number of symbols (n above). This last result (S.Hart, M.Sharir, 1984) started a new wave of results and applications of the concept. This book presents a comprehensive treatment of this development in all its aspects: combinatorial (extremal) theory, geometric realizations, algorithmic aspects, higher dimensional analogues. Moreover 10 main areas of applications are listed. This is a very well written and readable book suitable as a textbook for upper undergraduate and junior graduate students. It is entirely selfcontained. (jne)

S.Hamer: *Méthodologie de l'enseignement des mathématiques*, De Boeck-Wesmael, Bruxelles, 1995, 120 pp., Bfrs 420.00, ISBN 2-804-11751-0

The group of S.Hamer, formed by secondary school and university teachers, chose as a subject of its seminar pedagogical problems related to a school presentation of the notion of the primitive function. The outcome of this activity is not a textbook on the subject, it is rather a discussion of various methodological questions. The first chapters of the book are devoted to motivations, choices of definitions and problems of notations. Then questions of the existence and the structure of primitive functions are discussed and teaching the calculus of primitive questions is analysed. The concluding chapter concerns the role of exercises in this part of mathematical analysis. (in)

K.Reich: *Die Entwicklung des Tensorkalküls. Vom absoluten Differentialkalkül zur Relativitätstheorie*, Science Networks - Historical Studies, vol.11, Birkhäuser, Basel, 1994, 331 pp., DM 168.00, ISBN 3-764-32814-2

The author describes the formative process of tensor calculus in differential geometry initiated by Gauss, followed by Riemann who introduced the curvature tensor and the first steps of the use of tensors in elasticity theory. The theory of space forms brought further impulses to the origin of the theory of invariants. The main topics from the theory of differential invariant, covariant-equations, and the absolute differential calculus are discussed. The author also touches on the concept of group in connection with the absolute differential calculus. Tensor calculus by itself appeared only in Voigt's Crystallography of 1910. It gradually entered vector calculus, electrodynamics, and elasticity theory. At the end of the book, the author analyzes applications of tensor calculus to relativity theory, and its geometrization. Extensive references (pp. 257-315) and a detailed index are attached. (jfo)

A.Cohen, R.D.Ryan: *Wavelets and Multiscale Signal Processing*, Applied Mathematics and Mathematical Computation 11, Chapman & Hall, London, 1995, vi+238 pp., GBP 35.00, ISBN 0-412-57590-6

This book is based on *Ondelettes et Traitement Numérique du Signal* by Albert Cohen (1992, Mason, Editeur, Paris). It has been translated from French by

Local Analysis for the Odd Order Theorem

HELMUT BENDER and GEORGE GLAUBERMAN

This book presents a new version of the local analysis section of the Feit–Thompson theorem. It includes a recent (1991) significant improvement by Feit and Thompson and a short revision by T. Peterfalvi of the separate final section of the second half of the proof.

£19.95 net PB 0 521 45716 5 186 pp. 1995

London Mathematical Society Lecture Note Series 188

Topics in the Constructive Theory of Countable Markov Chains

G. FAYOLLE, V. A. MALYSHEV and M. V. MENSNIKOV

The main point of the present book is to provide methods of analysing Markov chains based on Lyapunov functions. The authors provide not only a self-contained introduction to the theory but also details of how the required Lyapunov functions are constructed in various situations.

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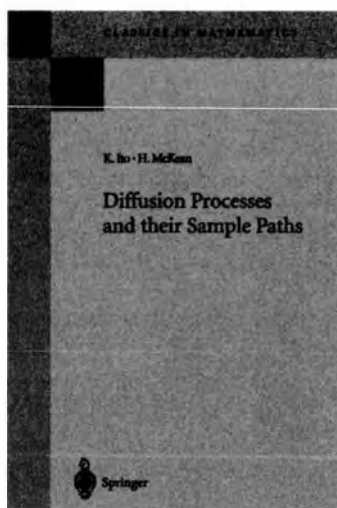
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