European Mathematical Society

NEWSLETTER No. 12

1st June 1994

JEMS: A new mathematical Journal for Europe?

Member's questionnaire

EMS Lectureship

New!: Problem Corner

The Alexander von Humboldt Foundation

Mathematics Education

Euronews

Editors

Ivan Netuka
Mathematical Institute
Charles University
Sokolovská 83
18600 PRAGUE, CZECH REPUBLIC

David Singerman
Faculty of Mathematical Studies
The University
Highfield
SOUTHAMPTON S09 5NH, ENGLAND

* * * * * * * *

Editorial Team Southampton:
D. Singerman, D.R.J. Chillingworth, G.A. Jones, J.A. Vickers

Editorial Team Prague:
Ivan Netuka, Jiří Rákosník, Vladimír Souček

* * * * * * * *

Editor - Mathematics Education
W. Dörfler, Institut für Mathematik
Universität Klagenfurt, Universitätsstraße 65-57
A-9022 Klagenfurt, AUSTRIA

Editor - History of Mathematics
J. Gray, Faculty of Mathematics
The Open University
Milton Keynes, MK7 6AA, UK

USEFUL ADDRESSES

EUROPEAN MATHEMATICAL SOCIETY

Executive Committee Meeting
Oberwolfach, Germany, 19–20 March 1994.

Mathematical difficulties in various parts of Eastern Europe were reported to the Committee. Georgia has problems with its academic libraries. Sarajevo, despite its tragic situation of despair, still has a flicker of mathematics. The Committee will help as best it can. In this connection the Committee is keen to give some support to East Europe mathematicians and was somewhat disappointed that an announcement offering support in the December 1993 Newsletter had not attracted as many applications as had been expected. Did potential applicants, especially young ones, not know?

More cheerfully it was noted that the University of Crete is successfully running conferences within the Human Capital and Mobility programme of the European Union.

The Committee believes that the EMS should be able to give Honorary Membership to a person who has made an outstanding contribution to mathematics; societies commonly have a provision in their rules to make an honorary membership possible. In the case of the EMS it is proposed to make an appropriate amendment to By–Law 29. Whom should one honour?

As an initiative the Committee has founded an 'EMS Lectureship'. This will enable a series of lectures to be given by distinguished mathematicians in one or two locations. Negotiations for the first EMS Lectureship are in train. What suggestions for speakers and offers for locations will emerge in future years?

Much discussion centred on the Council meeting in Zürich and on the means to promote its smooth running. The Committee is proposing an amendment to By–Law 16 in order to simplify the voting procedure for its Officers and ordinary members (and thereby to ratify the procedure actually followed in Paris). To facilitate matters the Committee will also make some suggestions for potential Officers and ordinary members.

The European Congress of Mathematicians has now been accepted as an activity of Expo '96 in Budapest – this should ensure a large number of dependents of participants! The dates for the Congress are 21–27 July 96; arrangements, including financing, are moving forward!

Funding is expected from the European Science Foundation for various series of euroconferences. Watch for the impending announcements!

The Committee has been alerted to the existence of an EU proposal apparently concerning the recognition of academic degrees. Is formal recognition really needed? Do mathematicians not easily 'recognise' other mathematicians?

No doubt this last point and many other issues, including the paucity of female mathematicians, remain to be debated at Zürich. Let us hope that the Council meeting is a worthy dessert to the intellectual feast of the International Congress. Best wishes 'til then!

Finally the Committee, as indeed the mathematical community, offers its thanks and very best wishes to Professor M. Barner on his retiral at the end of 1993 from the Directorship of the Mathematisches Forschungsinstitut after more than 30 years of very great success. The Committee is pleased to welcome Professor M. Kreck of Mainz as the Director from 1 February 1994 and to thank him for recent hospitality. 'Oberwolfach' is destined to go on from strength to strength.

report6   **D.A.R. Wallace**

⚇⚇ European Mathematical Society

Ballot 1/1994

ELECTION OF COUNCIL DELEGATES REPRESENTING INDIVIDUAL MEMBERS

The following persons were elected for Council delegates representing individual members, to serve for the years 1994–1997:

Castellet, Manuel (300 votes)

Jaiani, George (265 votes)

Kufner, Alois (297 votes)

Langevin, Remi (309 votes)

Michor, Peter W. (277 votes)

Schwarz, Wolfgang (256 votes)

Deputy delegates:

Eichhorn, Jürgen (196 votes)

Winkler, Jörg (95 votes)

Total number of ballots returned to the Secretariat: 407

JEMS: a new mathematical Journal for Europe?

A questionnaire for members of the EMS

The Executive Committee has been considering for some time ways in which the Society's publication activity might be extended for the benefit of its members, the mathematical community in Europe and the Society itself. It has concluded that the Society should seek to launch a general mathematical journal with a distinctive European flavour. This journal would carry research articles as well as surveys and survey reviews, texts arising from the new EMS lectureships programme, articles on European Congress prizewinners, scientific obituaries of European mathematicians of world rank, etc..

To this end the Society's officers have entered into discussions with a leading mathematics publisher in the hope of realising the project as a joint venture.

Despite the obvious difficulties to be found in starting any publication of this kind, particularly in the currently adverse economic climate, the Society hopes to be able to make the proposed journal available to its individual members on very favourable terms. More specifically it is intended to produce the journal in both print and electronic form, the latter to be automatically available to individual subscribers to the printed version, and to set the price at a comparatively low level.

Members are asked to assist in carrying this project forward by responding to the following brief questionnaire. Replies whether on photocopies of this page or E-mail responses should be sent to the Office of the Secretariat in Helsinki (whose address is on the cover of this Newsletter , or FAX to T Mäkeläinen Fax 0191 3213)

1. Question

    Would you subscribe on a personal basis to JEMS (Journal of the European Mathematical Society) in the form and on the terms suggested:

    Yes .... Possibly .... No ....

2. Question

    For an annual subscription comprising 4 issues of about 100 pages per issue would you be prepared to pay up to:

DM 50...	DM80...
FF 170...	FF 270
Pnd Ster 20	Pnd Ster 32
$30	$ 48

3. Question

    Do you believe that your institution's library could be persuaded to subscribe to JEMS and would be interested also in the electronic version:

    Yes .... Possibly .... No ....

4.   Comments

I should like to make the following comments for consideration by the Executive Committee:

....

If the journal is indeed launched, then the price will to some extent reflect the numbers of the subscribers that may be expected. The project will become a reality if and only if sufficiently many members express interest. The Executive Committee is very keen to extend the range of benefits that the Society can offer its members and very much believes that a successful journal of the type envisaged can contribute to this aim, as well as providing a powerful unifying force in the European Mathematical community.

Your co-operation in this matter is vital and will be greatly appreciated.

Reviewing Journals

The Executive Committee of the EMS has decided to set up a small Committee on Reviewing Journals. Its purpose is to monitor, from the consumer's point of view, all matters connected with the reviewing services provided by Math. Reviews, Zentralblatt and Referativnyj Zhurnal Matematika, to encourage cooperation on such matters as the formation of a joint database and more generally to represent the interests of EMS members in the preservation and extension of reliable and efficient reviewing services for mathematical publications. The EMS recognises the great value of these journals to the worldwide mathematical community, and is concerned that all necessary measures should be taken to ensure the long-term survival and efficiency of the services that they provide. The initial membership of the committee is

B Bojarski   (Warsaw, Poland; e-mail address impanw@plwatu21.bitnet)
E C Lance   (Leeds, UK; pmt6ecl@leeds.ac.uk)
R Piene   (Oslo, Norway; ragnip@math.uio.no)

EMS members who have opinions or suggestions about any matters connected with reviewing are urged to communicate with one of the members of the committee.

We have just heard that the Executive Committee of the International Mathematical Union has (at the suggestion of the EMS) decided to set up a committee to have an overview of the reviewing situation. The EMS committee would like to prepare a "consumers' report" to present to the IMU committee, and this makes it all the more important for us to know your opinions on the services currently provided by the reviewing journals and your ideas for future developments.

Please let us know your views!

EMS Lectureship

The Executive Committee has decided to set up a regular visiting Lectureship according to the scheme described below, and a distinguished mathematician has been invited to inaugurate the series. His reply is eagerly awaited, and we hope to announce further details in the next Newsletter.

1. Nature and purpose.

The idea of the EMS lectureship is that in each odd-numbered year a distinguished mathematician should be invited to visit an institution within the area covered by the EMS, to give a series of from three to five lectures of an advanced expository nature on a topic of current research interest. The lecturer should subsequently provide a written version, which should be submitted for publication by agreement with the Executive Committee[*]. In the selection of the venue for the lectures, preference should be given to institutions which might not otherwise expect to be able to host such a meeting. If the lecturer agrees, the lectures may be repeated at *one* other location, also within the area covered by the EMS but remote from the first.

2. Financial arrangements.

The EMS will pay travel expenses for the lecturer, and will also pay a lecture fee upon receipt of the manuscript. The host institution will be responsible for the lecturer's accommodation and living expenses, and for ensuring appropriate hospitality.

3. Timing and selection.

For the EMS Lectures in year n, there will be an announcement in the September issue of the Newsletter in year $n - 2$, inviting members to bid for a visit to their department by a named lecturer. At its first meeting in year $n - 1$, the Executive Committee will agree on an ordered list of the top three choices for (lecturer + location). The President of the EMS will invite the lecturer to be the EMS Lecturer for year n. If the lecturer declines the invitation then the second (and if necessary the third) choice will be approached. The host institution will then become reponsible for making the detailed arrangements for the lectures.

4. Initial arrangements.

There is necessarily a long timescale in inviting members to make proposals and in lining up top-quality speakers with busy schedules. Under the above proposals, the first lectures could not take place before 1997. The Executive Committee has therefore decided to use a less democratic procedure in setting up the first EMS Lectureship. At its meeting in March 1994 the Committee agreed on a choice of lecturer and location for the inaugural EMS Lecturer for 1995.

[*] If and when the *Journal of the European Mathematical Society* is established, it will normally publish the EMS lectures.

Report on the Committee on Developing Countries

P. Bérard, Institut Fourier, Grenoble (France)

This committee has been set up by the Executive Committee of the EMS in May 1993, as a consequence of the recommendations made on the occasion of the Round Table "Collaboration with Developing Countries" held during the first ECM in Paris.

Colleagues were contacted and the committee was (almost) completed by December 1993. The present list of members is as follows: Professor P. Bérard (Grenoble, Chairman), Professor K.D. Elworthy (Warwick), Professor M. Giaquinta (Firenze), Professor B. Goldsmith (Dublin), Professor J.P. Gossez (Bruxelles), Professor J.F. Jaulent (Bordeaux), Professor V. Maslennikova (Moscow; participation not yet confirmed), Professor G. Schiffels (Bielefeld), Professor A. Pelczar (Krakow) and Professor J.F. Rodrigues (Lisboa).

In the last months of 1993, after consultation of part of the members, it was decided to propose to the EC the following three items as first lines of action. They have been approved.

1) Ask the European Community to allow the recipients of EC funds (eg through HCM programmes) to use up to 10% of their funds to invite mathematicians from developing countries to participate in the scientific activities they organize;

2) Implement a "network of good libraries" in Europe that could provide scientific information to a selected list of institutions in developing countries;

3) Contact European publishers of mathematics journals in order to obtain (a limited number of) free subscriptions to be sent to selected mathematics departments in developing countries; same with books.

Contacts have been taken towards testing the possibilities to achieve these goals. Item 1) is rather political and it appears that the EC itself should get involved. Some contacts seem to show that Item 3) might not be too much of a dream; one difficulty though is the cost of handling and funds should be found to cover them. Item 2) might be implemented on the model of Bordeauxthèque (a documentation center towards francophone Africa which has been set up by the University of Bordeaux).

CALL FOR COLLABORATION

Bordeauxthèque is a documentation service, set up by the BMI (Bibliothèque de Mathématiques et d'Informatique, Université de Bordeaux). It applies to francophone African countries: see the report below.

Access to scientific information is one of the main difficulties encountered by our colleagues working in Developing Countries. The Committee on Developing Countries proposes to extend "Bordeauxthèque" to other parts of the world, with the collaboration of libraries at the European level.

WE NEED YOUR HELP !

Large libraries all over Europe could make agreements (similar to those made by Bordeauxthèque) with institutions in Developing Countries (other than those francophone Africa universities which are members of Bordeauxthèque already) and help break the scientific isolation of our colleagues. For this to work, we need neither much coordination (except to avoid duplicating work unnecessarily) nor bureaucracy (each library would remain independent apart from committing itself to do the job over a reasonable period of time). Some coordination might be welcome though.

If you want to join in the effort, please write to the address below :

Pierre Bérard, Institute Fourier, Université Grenoble 1,
B.F. 74, 38402 Saint Martin d'Héres Cedex (France)

fax: (+33) 76 51 44 78   E-mail: pberard@fourier.grenet.fr

BORDEAUXTHEQUE

Jean-François JAULENT (BMI Director)

6 décembre 1993

Bordeauxthèque is a documentation service for mathematicians and computer scientists working in French speaking universities. It is supported by the BMI (Research Library for Mathematics and Computer Science of Bordeaux).

This service has been growing considerably since its foundation in 1988 by J.-L. Joly, and now concerns over forty African universities. As a result of its success it has obtained the support of CIRUISEF and of CIMPA which will ensure most of its financing in the future.

To operate a modern research library requires a big investment and continuous spending. So, in spite of the fact that, especially in mathematics, up-to-date documentation is of the utmost importance, this documentation is often not available even to active mathematics departments, because of financial reasons. The aim of Bordeauxthèque is to help researchers of countries lacking proper bibliographical resources, by offering them access to the scientific literature at no cost in a simple, regular and efficient way. To do this, Bordeauxthèque relies on the remarkable wealth of the BMI.

HOW DOES BORDEAUXTHEQUE WORK ?

The documentation service Bordeauxthèque produces two volumes a year each consisting of 250 pages of summaries of about 60 periodicals which have been chosen following the wishes of our correspondents (for consideration, a periodical has to be required by at least two correspondents). These summaries allow our users to require from us photocopies of recent papers, which are then made by our staff and sent to our correspondents free of charge. Each request must be checked by the head of the department of the correspondent in order to avoid sending the same paper twice. For this, some request forms are sent with the two volumes of summaries.

Bordeauxthèque also publishes on a regular basis two lists : one of fundamental books covering the main topics in mathematics ; and one of titles recently acquired by the BMI. This keeps researchers informed on the resources available in Bordeaux. Moreover our users acknowledge with pleasure that our library's staff is always ready to answer any queries concerning addresses of journals, references, and so on ...

SOME DATA

The three volumes published by Bordeauxthèque in 1988, 1989 and 1990 have been distributed to some 70 French speaking universities (essentially in Africa). Each subsequent issue has been increased with more summaries at the request of our correspondents : the two biannual volumes produced since 1991 consist of the summaries of about 60 journals.

The number of photocopies sent by the service has steadily increased since its creation, as follows :

in 1988 : 4500 copies for 09 universities
in 1989 : 6000 copies for 15 universities
in 1990 : 7000 copies for 18 universities
in 1991 : 8500 copies for 29 universities
in 1992 :10200 copies for 43 universities
in 1993 :11800 copies for 47 universities

For instance, in 1991, some 668 requests from 153 researchers have been answered, each request amounting to an average of 13 copies. Of these requests 517 concerned very recent summaries.

PLANS FOR THE FUTURE

From the first six years of activity, it appears that Bordeauxthèque has been a success and has proven that there is a real need for such a service. Of course it is clear that there is room for improvement in its performances. For instance, starting 1994, we will be able to collect by scanner the informations on the summaries we publish. Our publications will be available on electronic support. However one has to keep in mind that most of our correspondents do not have access to electronic mail ...

To conclude we shall mention that Bordeauxthèque runs on a budget of about 70,000 FF. Even though this amount only represents between 5 and 10 % of the library's total spending, it allows the BMI to count among its users more out-of-town researchers than mathematicians working in Bordeaux.

Erratum

A typographical error crept into the article **OFFER FROM SPRINGER-VERLAG** in Newsletter No. 11. The price of Zbl for 1994 should have read **DM 8,340** plus carriage charges. A corrected version of the article is printed below. The editors apologise to all concerned for any misunderstandings that may have been caused.

European Mathematical Society

OFFER FROM SPRINGER-VERLAG

The EMS is pleased to announce a benefit in the form of a discount offer for "Zentralblatt für Mathematik und ihre Grenzgebiete (Zbl)" to its corporate members: Springer-Verlag has offered a 15% discount on the regular subscription price. Member societies of the EMS may make this offer available to all their individual members (whether or not they are individual members of the EMS) as well as to all their institutional members.

The operational details of the discount scheme will be as follows: Springer-Verlag will inform each participating society about the price of the discounted Zbl subscription for the following year annually at the end of June. The society will ascertain which of its (individual or institutional) members wish to take advantage of the discounted price for the following year, and will inform Springer-Verlag by the end of November of the number of subscriptions required and supply Springer with a list of the addresses of all subscribers in a format agreed with Springer-Verlag. Springer-Verlag will then send an invoice for the total amount due for the discounted subscriptions to the member society, which will pay this amount by the end of December. (Participating societies will notice that it will be in their interest to collect payment from subscribers before December in order to meet the deadline.) Springer-Verlag will mail the Zbl issues directly to its subscribers within fourteen days after the date of publication.

Member societies wishing to take advantage of this scheme should contact

Springer-Verlag
Angela Fabian
Customer Services/Distribution
Heidelberger Platz 3
D-14197 BERLIN

Tel: (30) 8207-342   Fax: (30) 8207-448

They should state that they act as a corporate member of the EMS, and should give the name, address and official position of the person within the society who will handle the discount scheme.

The EMS is grateful to Springer-Verlag for making this offer available, and hopes that its member societies will find this an attractive benefit of being a member of the EMS, helping them to recruit institutional members. Please note that the EMS cannot directly negotiate discounted Zbl subscriptions. These must be arranged through an EMS corporate member as described above.

For your information: the regular subscription price of Zbl for 1994 is DM 8,340 plus carriage charges. Please note that we have very attractive offers for those subscribing additionally to the CD-ROM CompactMATH and/or the online-database MATH. Please be informed that within the European Union the local VAT (of your member's country of residence) is effective.

Problem Corner - Organized by Paul Jainte

StR, Werkvolkstraße 10, D - 91126 SCHWABACH, Germany

This is the first of a series which we hope will interest our readers.

Problems are the lifeblood of mathematics. Throughout the centuries, from the time of the Sumerian and Babylonian civilisations, one can find no end of mathematical problems and questions - since problems and questions beget more problems and questions in a never-ending cycle. Problem-solving is a constant theme running through publications, too. One of the earliest periodicals to feature a section on problems was the *Ladies' Diary*, which first appeared in London in 1704. In England and Continental Europe, periodical publications have contributed much to the diffusion of mathematical learning, and some of the greatest scientific characters of those countries commenced their mathematical career by solving the problems proposed in such works. Malicious gossip has it that for example the *Ladies' Diary* produced more mathematicians in England than all the mathematical authors of that kingdom. But it's safe to say that not a few of the ablest teachers and mathematicians were first inspired with a love of mathematical science by the problems and solutions published in the mathematical section of some modest periodical.

Here's just another such section on problems: **the Problem Corner.** This regular column on problem-solving will carry problems

- for different age groups
- coming from a variety of competitions throughout the world with different degrees of difficulty (categorized as (pre)-Olympiad style problems for students, varying from Junior (Euclid level) through Senior (Olympiad level) to undergraduate-level problems)
- featuring the most important problem- solving techniques typically encountered in undergraduate mathematics.

I presuppose that devoting parts of this Corner to contests at the pre-Olympiad level would be of interest to the readers, and especially useful to those getting started, either as problem-solvers themselves, or as coaches of students. I have access to some material which is appropriate, but mostly from overseas sources. I would welcome suitable papers from all our readers who have extensive experience in preparing students for a contest, in order to give this aspect of the Corner an international scope and appeal.

One of the striking characteristics of most problem sections is the high incidence of participation by eminent mathematicians as well as by the 'man in the street' lover of mental gymnastics. So, if you like mixing business with pleasure (in this case the business of teaching mathematics) then become a supporter of this new section. How can you show your support, then? I hope that this Corner will provide a forum for the exchange of interesting problems and solutions among the members of the European mathematical community, teachers alike, bearing in mind that problems play key roles in mathematics education and even in education in general. I'm very interested in showing how different countries produce different types of problems. Some of these styles of problems are reflected in the work with students of high ability in these countries. Therefore this Corner is open for your favourite ideas connected with problems. We invite you to share with us your extensive experience in the field of coaching students or teams.

Propose problems for which readers will send in solutions. They can be anything from elementary to advanced, from easy to difficult. Because of the great variation in age of our potential students, I'll try to see that a varied diet is served in every issue of the NEWSLETTER. If one looks at the world's maths competition scene one observes a striking imbalance: there's a clear dominance of Olympiad-type competitions. Therefore I would greatly appreciate receiving any papers about existing non- or pre-Olympiad-type competitions. Original problems are particularly sought. So please submit any interesting problem you come across, especially those from (problem) books and contests that are not easily accessible. For it is often to be regretted that hundreds of ideas occurring in current competitions float around for a while and then vanish, never to be seen again! Send in solutions to proposed problems, including problems you propose yourself. Preferred solutions will be short and elegant rather than long and laborious. All correct solutions will be acknowledge in print, and the best ones will be published in full. Proposals should be accompanied by any information that will assist the editor.

To get things going I give the 7 problems of *The Mandelbrot Competition, Individual Test Round 1, Division A, November 1993.* The Mandelbrot Competition is one of the few high school mathematics competitions designed to educate participating students as well as challenge them. Competition topics include all non-calculus subjects usually found in the high school curriculum, such as geometry, trigonometry, functions, and complex numbers, plus a few subjects, such as number theory and classical inequalities, which most high school students are not exposed to.

This competion is broken down into 5 rounds, to be administered on specific dates during the school year. Each round consists of an Individual Test and a Team Test. The individual portion is made up of seven short-answer questions, valued by difficulty at one, two, or three points. The participating students have 40 minutes to complete their work on the Individual Test, which is then marked by the Mathematics Team Coordinator.

This will be the third year that the Mandelbrot Competition has two divisions. Division A is for more advanced problem-solvers, for example those students who hope to do fairly well in the AIME (American Invitational Mathematics Exam). Division B is for less experienced students, those who are preparing for the AHSME American High School Mathematics Exam). The problems below comprised Round 1 of the last year's competition. I hereby invite my readers to share them with their colleagues and students.

1. In the figure, ABCD is a square of side length 1, and M and N are the midpoints of AB and CD respectively. Find the area of the shaded region.
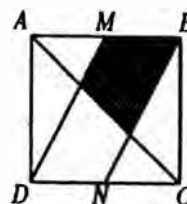
2. Jayne writes the integers from 1 to 2000, inclusive, on a piece of paper. She erases all the multiples of 3, then all the multiples of 5, and so on, erasing all the multiples of each odd prime integer. How many numbers are left when she finishes?

3. A certain type of lottery ticket pays $100 two percent of the time, pays $50 five percent of the time, allows you to get two more tickets for free five percent of the time, and is worthless the rest of the time. If the company marketing the tickets wants to break even on average, how much should it charge per ticket?

4. In right triangle ABC, with right angle at C and angle $\angle A = 36°$, a circle is inscribed touching $\overline{BC}$ at R, $\overline{AC}$ at S, and $\overline{AB}$ at T. Find the angle $\angle RTS$.
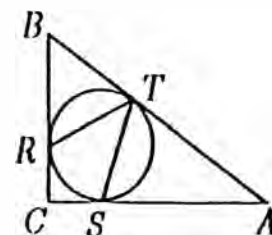
5. The set A contains 12 points in space, and a subset B of A contains 7 points which lie in a single plane. If all groups of four coplanar points in A are subsets of B, then how many distinct planes may be drawn which pass through 3 or more points of A?

6. What is the largest prime divisor of $3^{15} + 1$?

7. Evaluate $\dfrac{19}{93} + \dfrac{19 \cdot 18}{93 \cdot 92} + \dfrac{19 \cdot 18 \cdot 17}{93 \cdot 92 \cdot 91} + \cdots + \dfrac{19!}{93 \cdot 92 \cdots 75}$ as a fraction in lowest terms.

That completes this first quarterly Corner. I will continue *The Mandelbrot Competition,* Team Test, in the next issue. Send me your nice solutions, as well as Olympiad and pre-Olympiad contests. Then, we can make this problem corner a 'jackpot' which gains in value as more of you throw your contributions in!

The Alexander von Humboldt Foundation

40 years in the service of science and research

Dr. Michael Meier
Alexander von Humboldt-Stiftung, Department Sponsorship Abroad
Jean-Paul-Str. 12, D-53173 Bonn
Federal Republic of Germany

On December 10, 1993, the Alexander von Humboldt Foundation celebrated the 40th anniversary of its re-establishment after World War Two in 1953 by Konrad Adenauer, then also Foreign Minister of the Federal Republic of Germany. It was a stroke of good fortune that he was able to get Werner Heisenberg as the Foundation's first President. The aim of the statesman Konrad Adenauer was to give impetus to the external cultural policy of the then young Federal Republic; the goal of the scientist Werner Heisenberg was to promote cooperation between German and foreign scholars.

In the past four decades the Alexander von Humboldt Foundation has sponsored 15,152 foreign scholars as research fellows and research award winners and 933 German academics as research fellows. The foreign scholars have spent extended periods of time as guest-researchers in Germany, and the Humboldt Foundation has subsequently maintained contact with them through various initiatives. Sponsorship has been accorded in all disciplines and has been open to scholars from all countries. Academics from 120 nations took advantage of this opportunity. Some 3,947 were humanities and social sciences scholars, 9,703 natural scientists and 1,502 engineers. About 81% of the research fellows and 70% of the research award winners spent their stay at German universities, the remainder went to non-university research institutions (particularly Max Planck Institutes).

A decisive factor for success was the fact that individual achievement and academic qualification was the sole criterion in the selection of foreign scholars and that only those able to meet up to critical examination by the Selection Committee had a chance. Sex, race religion or ideology played no role in this, thus making it possible for scholars to be selected on the basis of their high qualifications, even when political and diplomatic relations between Germany and their home countries had not yet been established or were temporarily interrupted.

From the outset, the philosophy of sponsorship was based upon the conviction that contacts with foreign scholars should be fostered in the most personal way possible, to be continued after the scholars' return home. Lifelong partnership and even friendship has developed from cooperation with German colleagues.

The activities of the Humboldt Foundation in those 40 years were financed mainly from Government funds amounting to one billion Deutchmarks (particularly from the Federal Foreign Office and the Federal Ministry for Research and Technology, the Federal Ministry of Education and Science and the Federal Ministry for Economic Cooperation and Development).

Before proceeding to a closer analysis of how the fields of mathematics and computer science are represented in the Humboldt programs, it is favourable to give a brief general introduction to the two main sponsorship possibilities offered by the Foundation to foreign scholars.

Humboldt Research Fellowships constitute the oldest of all programs, introduced in 1953. The Humboldt Foundation grants up to 500 research fellowship annually to highly qualified foreign scholars holding doctorates and aged up to 40, enabling them to carry out research projects of their own choice at selected university institutes or other research establishments. Applications are decided upon by a Selection Committee, which is chaired by the president of the German Research Society and composed of 100 eminent German scholars from all fields of research. In this context it is important to note that there are no limitations or quota with respect to specific disciplines or individual countries. Research fellowships are awarded in an international competition across all disciplines. Fellowships are granted initially for six to 12 months and may be extended by several months on application.

Humboldt Research Awards originally were granted under a special program established in 1972 for natural science scholars and engineers from the U.S.A. as part of a donation made by Germany to express its gratitude for assistance received from the U.S.A. under the Marshall Aid Plan. This program has meanwhile been extended to all disciplines and nations. Up to 200 research awards are granted annually to internationally distinguished scholars. In contrast to research fellowships, for Humboldt Research Awards direct applications are not accepted. Only high ranking German scholars are entitled to submit nominations. There is no age-limit under this program. Awards, which range from DM 20.000 to DM 120.000, involve periods of research of four to 12 months at German research institutes.

Of the 15,152 foreign scholars sponsored by the Humboldt Foundation during the past four decades as research fellows (13,297) and research award winners (1,775), some 833 (5.5%) work in the fields of mathematics, statistics and computer science (685 research fellows and 148 research award winners). Statisticians and computer scientists form less than one fifth of this group.

It is very interesting to note that the percentage of mathematical research fellows among the entire group of Humboldt fellows has risen considerably from 2.5% in the first decade (1953-1963) to 4.5% in the third and even to 7.4% in the fourth decade (1984-1993).

The 685 research fellows sponsored in the fields of mathematics, statistics and computer science have come from 65 different home countries, the majority being from the U.S.A. (104), Japan (54), the member states of the former Soviet Union (53), Poland (51), the People's Republic of China (40), Hungary (38), Rumania (34), India (26) and Great Britain (23). In contrast, in the overall distribution of research fellows from all disciplines, Japan occupies the first position, closely followed by the U.S.A., while Rumania is not among the 15 most frequently represented countries. Furthermore, Vietnam holds some remarkable record: of the 34 research scholars from this country sponsored by the Humboldt Foundation more than half (19) work in the field of mathematics.

The distribution of the home countries of the 148 research award winners from the fields of mathematics and computer science is rather different, mainly due to the historical development of the Humboldt Research Award Program as outlined before: U.S.A. (135), France (4), Australia, Belgium, Byelorussia, Canada, Denmark, Great Britain, Israel, Italy and Sweden (1 each).

Among the former Humboldt guest researchers one can find numerous illustrious names of mathematicians such as S.-s.Chern, M.H.Freedman, F.W.Gehring, M.Giaquinta, I.Gohberg, F.John, N.Kuiper, S.Mac Lane (who had first been sponsored as a Humboldt research fellow in 1931 and 50 years later received the Humboldt research award), B.B.Mandelbrodt, J.W.Milnor and S.T.Yau, to name but a few. The complete list includes several recipients of the Fields Medal as well as of the prestigious Wolf Prize of the Wolf Foundation in Israel.

In the past decade, the host institution chosen most frequently by the research fellows in mathematics has been the University of Bonn, followed by the Universities of Bielefeld, Darmstadt, Heidelberg, Bochum and Tübigen, and the Max-Planck-Institute for Mathematics in Bonn. The research fellows working in the fields of computer science and statistics, on the other hand, most often spent their research stay at the University of Erlangen, the Technical University of Munich and the Universities of Bonn and Würzburg. As regards the research award winners from the field of mathematics, the University of Bonn occupies the first position among the most frequently chosen host institutions, followed by the Max Planck Institute for Mathematics in Bonn and the Universities of Heidelberg. Karlsruhe and Bielefeld. The University of Bonn and the Technical University of Munich lead the list of host institutions most frequently chosen by the research award winners working in the field of statistics and computer science.

Finally, the Humboldt Foundation also offers some sponsorship opportunities for German scholars.

Feodor Lynen Research Fellowships, which were introduced in 1979, pursue two aims. They are intended to sponsor junior German researchers and at the same time to serve follow-up sponsorship of former Humboldt guest researchers abroad. Up to 200 Lynen fellowships are granted annually to highly qualified German scholars, holding doctoral degrees and aged up to 38, to carry out research projects of their own choice abroad at institutes of and in collaboration with former Humboldt guest researchers. These fellowships are financed jointly by the Humboldt Foundation and the host institutes. In addition, the Humboldt Foundation proposes German candidates for 30 research fellowships granted annually by the Japan Society for the Promotion of Science (JSPS) and the Science and Technology Agency (STA) for long-term research stays in Japan. Of the 933 German research fellows sponsored under the auspices of these programs in the past four decades, only a relatively small fraction is working in the fields of mathematics (37) and computer science (2). Most of these scholars selected their host institute in the U.S.A. (26), in Japan (4) or in Canada (3), while only two of them went to a European country. The mathematicians among the former Lynen fellows have been particularly successful in their subsequent professional careers, a considerable number of them having obtained chairs at universities in Germany and abroad and received prestigious awards.

Under all sponsorship programs, the Humboldt Foundation focuses its efforts on the best. This also applies to research cooperation projects. Since 1990, the Max Planck Society and the Humboldt Foundation jointly grant *Max Planck Research Awards* for outstanding research cooperation between internationally acknowledged foreign and German scholars to enable award winners to finance cooperation over a period of three years. Of the 105 research groups having received this award to date, 7 are working in the field of mathematics and one in computer science. The cooperation partners of the German scientists are from Canada, the People's Republic of China, the Czech Republic, Israel, Russia and the U.S.A.

The Feodor Lynen Program and the Max Planck Research Awards are two convincing examples demonstrating that the sponsorship activities of the Alexander von Humboldt Foundation are not a one-way affair. All partners benefit from it in a varied, future-oriented way.

ARTICLES FOR FUTURE EDITIONS of EMS NEWSLETTERS

Files - e-mail   Mrs B Betts: bjb@uk.ac.soton.mail

Articles camera ready for printing or on disk (Wordperfect)T_EX

Paper size A4   **SINGLE SPACING**   **Font size 10.5**

Freudenthal Institute

Research group on Mathematics Education

The Freudenthal institute was founded (under the name IOWO) in 1971 and forms at present part of the faculty of mathematics and computer sciences of the Utrecht Universiteit. The Freudenthal Institute (Fi) is also part of the Center for Science and Mathematics Education. Fi is known as an international institute for the development of mathematics and computer science education. It has carried out projects for the Dutch Department of Education resulting in implementation of new curricula for secondary education. For primary education new curricula were influenced and formed by the institute in a more informal way, resulting in the fact that more that 75% of the schools have started using books representing the institute's philosophy on realistic mathematics education.

The successful implementation of this philosophy, both in the Netherlands and via several projects abroad is due - amount others - to the interdisciplinary approach: mathematicians, physicists, psychologists, teachers, teacher trainers, educators, form a coherent team of more than 60 people (not all full time). The institutional capacity is therefore quite large. Besides those working at the institute there is also a fairly large number of people working with the institute which enables the Fi to have a networking function in the world of mathematics and computer sciences education.

Journals:
Nieuwe Wiskrant, Journal for Dutch mathematics Education;
     Editors: Drs.D.Kok, Mrs.M.Moonen-Harmsen, Mrs.Drs.H. Verhage.

Panama Post, Journal for Teacher Training and Research of Mathematics Education;
     Editors: I.Verkruijsse, Dr.R.de Jong, E.de Moor, Mrs.Drs.N.Ruesink, Dr.L.Streefland, Mrs.Drs.A.C.Vuurmans.

Freudenthal Institute
Research Group on Mathematics and Computer Science Education
tiberdreef 4, 3561 gg Utrecht, The Netherlands.

Tel: +31 30 611 611   Fax: +31 30 660 430   Email fl@fl.ruu.nl applelink hol0402

Utrecht Universiteit
Faculty of Mathematics and Computer Science

Evaluating Learning Technology - A Database of Research

Brian Hudson
Mathematics Education Centre, Sheffield Hallam University
25 Broomgrove Road, Sheffield S10 2NA, UK

The purpose of the ELTDOR (Evaluating Learning Technology - A Database of Research) Project was to develop a database which would contain references to the considerable body of research which has been carried out into the effectiveness of computer related technology in teaching and learning. The production of the database was funded by the Learning Technologies Unit of the UK Employment Department and carried out at Sheffield Hallam University between March 1992 and February 1993. In addition to the database a specialist document collection was also established.

The evaluations focus on one or more of: learning effectiveness; cost effectiveness; learning time; learning motivation; student response; and teacher response. Many of these look at the learning experience in general terms whereas other concentrate on more specific aspects of using computers. Evaluations have been conducted in a variety of ways and the database includes a number of records which focus upon research methodology. No particular approach has been favoured or excluded in compiling the database; comparative studies using control groups are included together with descriptions of action research undertaken by one teacher with one group. The debate is represented by many items which concentrate on methodology, purpose or priorities.

Apart from a few exceptions the data base is restricted to material published in or after 1985 which, in practice, covers studies carried out in or after 1983-4. The exceptions are overviews, in the form of bibliographies, literature reviews or meta-analyses, which go back before 1985. Users who are interested in earlier material are thus able to have access to a limited number of sources, which provide both some general impressions of previous research and the opportunity to follow up a substantial number of references.

Both education and training are covered although there are far more references to the former. Nearly thirty countries are represented in the database although most records relate to work carried out and reported in the UK or the USA. References have been obtained from: electronic databases (CD-ROM and online); paper-based abstracts; journal runs, cited references; holdings of specialist libraries; occasional bibliographies; and institutional publication lists. The database with the largest holding of relevant references is ERIC. A decision was taken to exclude most of these records because of the time-scale of the project and wide availability of ERIC. The exceptions are those which refer to overviews or evaluation methodology.

At present the database is delivered on one floppy disk by means of a runtime version of Data Ease for the PC microcomputer and it is envisaged that it will be updated on an annual basis.

The database contains approximately three hundred records of relevance to Initial Teacher Education (ITE). A small minority of these relate to the use of technology with ITE students directly but the vast majority are focussed in the school classroom. My involvement with ELTDOR arose when I was commissioned by the National Council for Educational Technology in the UK to present an overview of this section of the database of special relevance to ITE in general. This alerted me to the potential of this project in serving my particular interests, and therefore those of my students, in the field of mathematics education.

At the present time however the database contains reports on what is fairly narrow section of computer use in mathematics education although it does highlight some interesting trends and issues within the field. In fact much of the research which has been reported upon is equivocal and conflicts are evident on a range of issues. For example a clear conflict exists with regard to research methodology which is essentially one between a quantitative or a more qualitative approach. A further conflict exists between those who see the computer as an aid to a transmission model of learning and those who see it as enabling a far more open-ended approach to learning.

There is considerable evidence concerning cognitive development in relation to programming and the use of Logo in particular which is somewhat equivocal. However there is a significant number of more recent studies which are supportive of this contention.

With regard to Computer Assisted Instruction (CAI), there are some questions over research methodology but there is a large body of evidence which supports the view of its effectiveness especially in relation to its use with low attainers in the basic skills of numeracy. It is seen to be most effective when used over the short term as a supplement to and not as a replacement for more conventional classroom activity. The evidence related to cost effectiveness of CAI is equivocal.

There is also considerable evidence that the use of technology can be a catalyst for promoting autonomy, group work and discussion in the classroom. Much research has been focused in the area of Special Educational Needs with many positive findings. A significant body of research evidence specific to mathematics exists which relates to either the use of Logo or CAI in the main with many positive findings.

However it is recognised that the database at the present time contains little on microworlds, visualisation, multiple-linked representations and the role of imagery for example. I would particularly like to see the database strengthened in relation to its coverage of the field of mathematics education. Readers are invited to send copies of research reports and abstracts to Sean Barr, Project Officer, ELTDOR, Centre for Multimedia in Education, Sheffield Hallam University, 36 Collegiate Crescent, Sheffield, S10 2BP, with a view to their inclusion in future updates of the database. Alternatively suggestions for the inclusion of the work of particular writers and researchers would be welcomed.

EUROPEAN NEWS: Country by Country

CRETE

The Department of Mathematics of the University of Crete announces the two first conferences of the series Euroconferences in Mathematics on Crete, sponsored by the Human Capital and Mobility Programme of the Commission of the European Communities.

10-16 July 1994 **COMBINATORIAL GEOMETRY** (Polytopes, Configurations, Lattices)
Organizers: P. Mani (Bern, Switzerland), J. Wills (Siegen, Germany), G. Ziegler (Berlin, Germany)
Main speakers: C. Lee (University of Kentucky, USA), P. Mani (Bern, Switzerland), P. McMullen (London, United Kingdom), J. Wills (Siegen, Germany), G. Ziegler (Berlin, Germany)

17-23 July 1994 **ACTIONS OF LIE GROUPS AND DISCRETE SUBGROUPS ON MANIFOLDS**
Organizers: G. Margulis (Yale University, USA), R. Zimmer (University of Chicago, USA)
Main speakers: H. Abels (Bielefeld, Germany) A. Katok (Pennsylvania State University, USA), F. LaBourie (Ecole Polytechnique, France), G. Margulis (Yale University, USA), R. Zimmer (University of Chicago, USA)

The conferences will take place at the Academic Village of Anogeia, a conference center located at the traditional Cretan village of Anogeia on the slopes of the mountain Ida. Anogeia is located at an elevation of 750 m, about 45 minutes by car from Iraklion, the largest city of Crete, and about half an hour from the closest coast. The living expenses (accommodation plus meals) per day for a person are estimated at about 22 ECU in a double room or 30 ECU in a single room.

The Human Capital and Mobility Programme financially supports young researchers from the countries of the European Community to enable them to attend the conferences. For information please contact the local co-ordinator of the conference series indicated below. It is expected that financial support will be extended to young researchers from some countries of Central and Eastern Europe.

The conference series will continue in the next years with topics, which will be decided by the international scientific committee consisting of: H. Abels (Bielefeld, Germany), H. Bauer (Erlangen, Germany), C. Dafermos (Brown University, USA), O. Kegel (Freiburg, Germany), S. Papadopoulou (Crete, Greece), V. Thomée (Göteborg, Sweden), A. Wilkie (Oxford, United Kingdom). The next meeting of the committee will be in Spring 1994. Suggestions for topics for future conferences should be sent to the local co-ordinator of the series.

For additional information please contact the local co-ordinator:

Susanna Papadopoulou
Department of Mathematics
University of Crete
Iraklion, Crete, GREECE

Fax-Nr.: 81-234516
e-mail: souzana@talos.cc.uch.gr

or, for the conferences of 1994:

G. Margulis
Department of Mathematics
Yale University
New Haven
Connecticut 06520, USA

e-mail: margulis-gregory@math.yale.edu

G. Ziegler
Konrad-Zuse-Zentrum
für Informationstechnik Berlin
Heilbronner Strasse 10
10711 Berlin-Wilmersdorf, GERMANY

e-mail: ziegler@sc.zib-berlin.de
Tel: 30/89604-211, Fax-Nr: 30/89604-125

DENMARK

Thanksgiving Workshop on Controlled Topology, Geometry and Algebra

Date: **21 - 27 November 1994.**

Location: **IMADA, Odense University, Odense, Denmark.**

This is an informal workshop centred around (the US) Thanksgiving in time and around Controlled Topology, Geometry and Algebra as far as topics go.

Participation: Mainly by invitation. There will, however, be room for a few extra participants.

Proceedings: A volume of proceedings is planned.
All papers will be refereed.
A few papers from workshop-non-participants can be included.

Deadline: For submission of papers: Jan. 1, 1995.

Participants: So far, the following invitees have indicated that they expect to attend: Douglas R.Anderson, Oliver Attie, Steve Ferry, Ian Hambleton, Tadeusz Kozniewski, Ib Madsen, Erik Kjær Pedersen, Stratos Prassidis, Andrew Ranicki, Wolrad Vogell, Michael Weiss. Other invitees whose (final) answers are not yet in include: Gunnar Carlsson, Frank Connolly, Bruce Hughes, John Roe, Chuck Weibel, Shmuel Weinberger, Bruce Williams.

Organizer: Hans J. Munkholm.

Sponsors: The workshop is sponsored in part by grants from SNF, Denmark, and from the European Union.

Information: Hans J. Munkholm, IMADA, Odense Universitet, DK 5230 Odense M, Denmark.
email: hjm@imada.ou.dk   **Tel:** +45 66158696 (tone) 2309 or 2387.
Fax: +45 65932691.

ENGLAND

Ninth British Topology Meeting

University of Southampton

Date: **21 - 22 September 1994**

First Announcement

We are pleased to announce that the London Mathematical Society has agreed to support the Ninth British Topology Meeting, which will be held at the University of Southampton. The programme will start at 9.30 am on Wednesday 21st September and finish on the afternoon of Thursday 22nd September. Accommodation will be offered in a University Hall on the nights on Tuesday 20th and Wednesday 21st at a cost of £20 per night.

As in the past, offers to speak on any aspect of topology will be welcomed, and there will be opportunities to display abstracts, and discuss current interests.

The LMS grant will be used to subsidise costs for those participants, particularly graduate students, unable to obtain funding from their own institutions. There will be a registration fee of £6 which will be used to cover administration costs.

Contact: Dr Graham Niblo, British Topology Meeting, Faculty of Mathematical Studies, University of Southampton, Southampton SO17 1BJ, UK.

E-mail   btm@maths.soton.ac.uk

FRANCE

INTERNATIONAL CONFERENCE ON CONVEXITY

Date:	**5 - 9 September 1994**
Location	**University of Marne-la-Vallée, France**
Co-organizers:	**The University of Marne-la-Vallée and the Association Stefan BANACH** **Alain Pajor and Sylvie Delabrierè**
Main speakers:	**N.Alon, K.Ball, J.Bourgain, Y.Burago, R.Gardner, T.Gowers, M.Gromov, P.Gruber, G.Kalai, B.Kashin, P.McMullen, V.Milman, M.Talagrand, N.Tomczak-Jaegermann, A.Vershik, J.Wills.**
· Contact:	Mireille Morvan, UMLV, Equipe d'Analyse et de Mathématiques Appliquées 2, rue de la Butte Verte, 93166 Noisy-le-Grand cedex, France. **Tel:** (33-1) 49 32 60 25 **Fax:** (33-1) 43 04 18 80 **e-mail:** convex@math.univ-mlv.fr

UNIVERSITE
PAUL
SABATIER

TOULOUSE III

MATRA MARCONI SPACE

PRIX FERMAT DE RECHERCHE EN MATHEMATIQUES

UNIVERSITE PAUL SABATIER - MATRA MARCONI SPACE

EDITION 1995

Le PRIX FERMAT récompensera les travaux de recherche de mathématiciens dans des domaines où les contributions de Pierre de FERMAT ont été déterminantes :

* Enoncés de principes variationnels
* Fondements du calcul des probabilités et de la géométrie analytique
* Théorie des nombres

A l'intérieur de ces domaines, l'esprit du prix est de récompenser plutôt des résultats de recherche qui sont accessibles aux plus grand nombre de mathématiciens professionnels.

D'un montant de **100 000 FF**, attribués par **MATRA MARCONI SPACE**, le Prix FERMAT est décerné tous les deux ans à TOULOUSE ; la quatrième édition aura lieu au Printemps 1995.

Le règlement du Prix, les modalités de dépôts de candidature, sont disponibles dès le 1er trimestre 1994, auprès de :

> Prix FERMAT de Recherche
> en Mathématiques
> Service des Relations Publiques
> Université Paul Sabatier
> 118 route de Narbonne
> 31062 TOULOUSE Cédex, FRANCE

Date limite de dépôt des candidatures : 20 Décembre 1994.
Les candidats potentiels sont priés de se conformer aux modalités de dépôt préconisées dans le règlement.

ICIAM 95

The Third International Congress on
Industrial and Applied Mathematics

July 3 - 7 , 1995

hosted by
Gesellschaft für Angewandte Mathematik und Mechanik (GAMM)

CCH Congress Centrum
HAMBURG

1st Announcement and Call for Papers

About ICIAM 95: The conference organizers are developing a programme that will focus worldwide attention on the importance of mathematical and computational methods in the solution of real world problems. A major exposition of computer hardware and software exhibits and demonstrations will enable you to explore state-of-the-art technology.

In addition to a programme highlighting important advances in research and applications, there will be many opportunities for you to meet your colleagues from other countries.

The first International Conference on Industrial and Applied Mathematics was held 1987 in Paris. ICIAM 87 attracted eighteen hundred scientists from applied and computational mathematics and applied sciences. This number climbed to over two thousand at ICIAM 91 in Washington, DC.

ICIAM 95 will be hosted by GAMM. President: **Oskar Mahrenholtz,** Technische Universität Hamburg-Harburg.

Conference Topics: The programme consists of invited and contributed lectures, minisymposia, poster presentations, and an exhibition.

The presentations are solicited in all areas of applied mathematics, computer science, applied probability and statistics, scientific computing, and applications in science, medicine, engineering, economics and other related fields.

Invited lectures and invited minisymposia cover the following areas:
Aircraft Flight Control; Applications of AIC in Industrial Technologies; Combustion and Nonlinear Diffusion; Computational Contact-Impact Analysis; Computer Science; Fluid Dynamics of Elastic Liquids; Fluid Mechanics and Applications; Global Climate Modelling; Image Processing; Kinetic Theory; Liquid Crystals; Mathematical Basis of Mechanics; Mathematical Biology; Mathematical Finance; Mathematical Physiology; Mathematics and High Technology; Mathematics in Industry; Mechanics and Asymptotics; Mechanics, Control; Modelisation of Semiconductors; Phase Transitions; Queus and Networks; Rarefied Gasdynamics; Boltzmann Equation; Robotics; Signals, Systems, Control; Stochastic Discrete Event Systems; Structure and Dynamic of Wrinkled Flames; Systems Analysis by Graphs and Matroids; Vortex Flow; Computational Fluid Dynamics; Wavelets.

Invited papers are given by A.Hirotsugu *(Tokio)*, V.I.Arnold *(Moskau, Paris)*, F.Baccelli *(INRIA, Valbonne)*, M.V.Berry *(Bristol)*, H.Brezis *(Paris)*, C.Cercignani *(Mailand)*, I.Daubechies *(New Jersey)*, P.Degond *(Toulouse)*, H.Föllmer *(Bonn)*, K.Hasselmann *(Hamburg)*, E.J.Hinch *(Cambridge)*, R.James *(Minneapolis)*, W.Kahan *(Berkely)*, J.B.Keller *(Stanford)*, J.L.Lions *(Paris)*, J.Marsden *(Berkeley)*, G.Meyer *(NASA, California)*, D.Mumford *(Cambridge)*, K.Murota *(Kyoto)*, H.Neunzert *(Kaiserslautern)*, L.G.Nilsson *(Linköping)*, F.Pfeiffer *(München)*, A.Perelson *(Los Alamos)*, C.Peskin *(New York)*, A.Quarteroni *(Mailand)*, R.Rannacher *(Heidelberg)*, G.Sivashinski *(Tel Aviv)*, A.Taylor *(Oxford)*, L.Trefethen *(Ithaka, NY)*, P.V.Dooren *(Urbana)*, M.Ward *(Vancouver, BC)*.

Contributed Presentations - Lectures or Posters: You are invited to submit a paper, which you may present in lecture or poster format. Authors will have approximately 15 minutes for the lecture, with additional 5 minutes for discussion. Alternatively they may elect poster presentations, which allow interactive discussions with individuals interest in their work.

If you like to present a paper (lecture or poster format), please submit a summary on an ICIAM 95 contributed paper form obtainable from address below. Deadline date for submission of papers: **August 31, 1994.**

Minisymposia: A minisymposium is a session of speakers focusing on a single topic. The organizer of a minisymposium invites the speakers and decides on the topic they are to deliver. If you would like to organize a minisympoisum, you must submit a proposal on an ICIAM 95 minisymposium form.

Form and guidelines for submitting a minisymposium proposal can be obtained from address below.

Deadline for submission of minisymposium proposals: August 31, 1994.

Registration Information: please contact

> GAMM-Office
> University Regensburg
> NWF I - Mathematik
> D - 93053 Regensburg, GERMANY
>
> Phone: +49 941 943 4918   Fax: +49 941 943 4005
> Email: ICIAM95@vax1.rz.uni-regensburg.d400.de

IROS '94

IEEE/RSJ/GI   International Conference on INTELLIGENT ROBOTS AND SYSTEMS

Advanced Robotic Systems and the Real World

Date: **12 - 16 September 1994**

Location: **Federal Armed Forces University Munich, Neubiberg/Muenchen, Germany**

Today our factories are equipped with standard robotic devices performing low-intelligence jobs, but the promise of "intelligent robots" remains largely unfulfilled. Even large robot manufacturers are fighting for survival and are reducing their research efforts. Also, some researchers are now realizing that their contributions have not always sufficiently addressed the problems of robots operating in the real world. Apparently, the top priority goal of the robotic community must now be to find a real break-through in autonomy, intelligence, and dexterity for the next generation of robots.

The annual International Conference on Intelligent Robots and Systems will in 1994 for the first time be held in Europe. During the conference about 300 contributions will be presented by internationally leading researchers from academia and industry of all parts of the world. They will show the latest advances in robot intelligence and dexterity proven by experiments or applications in the real world.

Main Topics

Intelligent Motion Control	Telerobotics
Coordinated Control Architectures	Shared Autonomy
Learning Control, Fuzzy Control	Dexterous Manipulation
Neural Network Techniques	Adaptive Locomotion
Advanced Sensors and Actuators	Autonomous Robotic Systems
Active Sensing, Vision, Perception	Multirobot Systems
Multisensor Integration	Micro Systems and Robots
Sensor-based Task Planning/Execution	Robots in the Factory
Environmental Modelling	Robotics in Unstructured Environments
Simulation and Virtual Reality	New Robotic Applications
Machine Learning	(Space, Under Water, Construction
Human Robot Interface and Interaction	Service Industry, Medicine etc)

Contact Address: IROS '94 Secretariat
c/o Universitaet der Bw Muenchen,
D-85577 Neubiberg/Munich, GERMANY

Fax: +49-89-6004-3074

GERMANY continued

THE WILKINSON PRIZE FOR NUMERICAL SOFTWARE

In honor of the outstanding contributions of James Hardy Wilkinson to the field of numerical software, Argonne National Laboratory, the National Physical Laboratory, and the Numerical Algorithms Group award a numerical software prize of US $1000. The first prize was awarded to Linda Petzold for DASSL at the International Conference in Industrial and Applied Mathematics (ICIAM 91). The second prize will be awarded at ICIAM 95 in Hamburg, July 3-7, 1995.

Rules for Submission

Each author of an entry must be under 40 years of age on January 1, 1995.

Each entry must contain the following:

- Software written in a widely available high-level programming language.

- A paper describing the algorithm and the software implementation. The paper should give an analysis of the algorithm and indicate any special programming features.

- Documentation of the software which describes its purpose and method of use.

- Examples of use of the software, including a test program and data.

- A one or two page summary of the main features of the algorithm and software implementation.

Submissions must be in English. Entries must be received by November 1, 1994.

Selection Criteria

The award will be made to the entry that best addresses all phases of the preparation of high quality numerical software, including

- clarity of the paper and software implementation and documentation;

- portability, reliability, efficiency and usability of the software implementation;

- depth of analysis of the algorithm and the software;

- importance of application addressed by the software; and

- quality of the test software.

Software can be submitted on 3.5-inch high density (1.44MB) diskettes, $\frac{1}{4}$-inch cartridge tape (60MB or 150MB), 8mm cartridge tape (2GB), or sent by email. Submissions should be in the form of a tar archive with a README file describing the contents of the archive. Makefiles for executing test programs must be included. Submissions can be sent by email to wilkinson_prize@mcs.anl.gov, or to the Board of Trustees, Wilkinson Prize for Numerical Software, at one of the following two addresses:

Argonne National Laboratory
Mathematics and Computer Science Division
9700 South Cass Avenue
Argonne, Illinois 60439
United States

Numerical Algorithms Group Ltd.
Wilkinson House
Jordan Hill Road
Oxford OX2 8DR
United Kingdom

GERMANY continued

ECMI 94

Date: 6 - 10 September 1994

The European Consortium for Mathematics in Industry. 8th International Conference

Location: University of Kaiserslautern

Programme: Mathematical Methods in aerospace industry, automotive industry, chemical industry, chip production, construction industry, finance, metallurgic processes.

Contact: Professor Helmut Neunzert, Fachbereich Mathematik, Universititaet, PO Box 3049, D-67653 Kaiserslautern, GERMANY.
Fax: +49-631-2053052   Email: ecmi94@mathematik.uni-kl.de

ISRAEL

Seventh International Conference on Geometry   FIRST ANNOUNCEMENT

Date: 2 - 9 April 1995

Location: Nahsholim, Israel.

Topics: Foundations of Geometry, Incidence Geometry, Geometric Algebra, Discrete and Combinatorial Geometry, and Convexity. A special section "Geometry and School" will be devoted to subjects related to Geometry in Mathematics Education. As in our previous conferences, lectures will be scheduled so that participants will be able to shuttle between the sections.

The participants and the accompanying persons will be accommodated in the Nahsholim Kibbutz Guesthouse, on the Mediterranean shore, 25 km south of Haifa.

The Second Announcement containing further details will be mailed to those who express their interest, later in the year. If you wish to get this second announcement, please detach the coupon below and mail it to us.

Organizers: Professor Joseph Zaks home phone: 04-231474, e-mail: J.Zaks@HAIFAUVM
Professor Rafael Artzy home phone: 04-382655, e-mail: RSMA787@HAIFAUVM

ITALY

Conference on Topological & Geometrical Problems Related to Quantum Field Theory

Date: 13 - 24 March 1995

Location: Miramare - Trieste, Italy

Invtied speakers will include: D.M.Austin *(U.B.C., Vancouver, Canada)*, S.Axelrod *(M.I.T., Cambridge, Massachusetts, U.S.A.)*, P.Candelas *(University of Texas at Austin, U.S.A.)*, P.Candelas *(University of Texas at Austin, U.S.A.)*, B.Feigin *(I.M.U., Moscow, Russian Federation)*, J.Harer *(Duke University, Durham, NC, U.S.A.)*, H.Hofer *(E.T.H., Zürich, Switzerland)*, L.Jeffrey *(Princeton University, U.S.A.)*, D.Morrison *(Duke University, Durham, NC, U.S.A.)*, M.Mulase *(University of California, Davis, U.S.A.)*, M.S.Narasimhan *(I.C.T.P., Trieste, Italy)*, R.C.Penner *(U.S.C., Los Angeles, CA, U.S.A.)*, A.K.Raina *(T.I.F.R., Bombay,India)*, S.Ramadas *(T.I.F.R., Bombay, India)*, S.Ramadas *(T.I.F.R., Bombay, India)*, R.Stern *(University of California, Irvine, U.S.A.)*, A.Todorov *(University of California, Santa Cruz, U.S.A.)*.

The closing date for submitting requests for participation is **31 August 1994.** The decision of the organizers will be communicated to all candidates as soon as possible thereafter.

Contact: International Centre for Theoretical Physics, Conference on Topological and Geometrical Problems Related to Quantum Field Theory, P.O. Box 586, I - 34100 Trieste, ITALY.

Tel: 040 22401   Cable: CENTRATOM   Telex: 460392 ICTP I   Fax: 040 224163

ITALY continued

WORKSHOP ON "KINETIC THEORIES AND HYPERBOLIC SYSTEMS"

II International Workshop on Nonlinear Kinetic Theories and Mathematical Aspects of Hyperbolic Systems"

Date:	26 - 30 September 1994
Location:	Sanremo, ITALY
Program:	Will include approximately forty invited lectures of thirty minutes, and two afternoons of short contributions.
Contact:	E. Gabetta, Dipartimento di Matematica Università di Pavia, via Abbiategrasso 209, 27100 Pavia. Italy. E-mail: ester@supers2.ian.pv.cnr.it Fax: *39-382-505602

QUATERNIONIC STRUCTURES IN MATHEMATICS AND PHYSICS

SCUOLA INTERNAZIONALE SUPERIORE DI STUDI AVANZATI-INTERNATIONAL SCHOOL FOR ADVANCED STUDIES
LABORATORIO INTERDISCIPLINARE PER LE SCIENZE NATURALLI ED UMANISTICH

Date:	5 - 9 September 1994
Location:	Trieste, Italy

The purpose of the meeting is to bring together scientists from different areas of Mathematics and Physics working in the field of quaternionic structures.

New results in the theory of quaternionic manifolds together with recent progress in Clifford Analysis and supersymmetric theories will be presented.

Preliminary list of speakers: L.Berard-Bergery *(Nancy)*, R.Bryant *(Durham)*, R.Delanghe *(Gent)*, B.de Wit *(Utrecht)*, S.Ferrara *(Cern)*, K.Galicki *(New Mexico)*, O.Hijazi *(Nantes)*, N.Hitchin *(Warwik)*, D.Joyce *(Oxford)*, C.le Brun *(SUNY at Stony Brook)*, A.Lichnerowicz *(Coll.de France)*, V.Ogievetsky *(Bonn)*, L.Pernas *(Amiens)*, J.Ryan *(Arkansas)*, A.Van Proeyen *(K.U.Leuven)*.

Contact:	Ms Rosanna Sain, Laboratorio Interdisciplinhare , SISSA, Strada Costiera, 11, 34014 Trieste (I) Phone: +39 40 224160 Fax: +39 40 224163

OTHER CONFERENCES

SINGAPORE

PACIFIC RIM GEOMETRY CONFERENCE

12-17 December 1994   **First Notice December 1993**

The Pacific Rim Geometry Conference, organised by the Department of Mathematics of the National University of Singapore, will be held from 12 December to 17 December 1994 at the National University of Singapore, Republic of Singapore. A previous conference in this series took place in Hong Kong in December 1992.

Speakers: The following have accepted invitations to give 50-minute lectures.
R.Bott (Harvard), A.Chang (UCLA), S.Y.Cheng (CUHK/UCLA), H.I.Choi (Seoul), J.Eells, F.T.Farrell (SUNY, Binghamton), K.Fukaya (Tokyo), R.Hamilton (UCSD), J.X.Hong (Fudan, China), P.Li (UC Irvine), C.S.Lin (CCU, Taiwan), N.Mok (Paris), T.Mrowka (Caltech), L.Simon (Stanford), K.Ueno (Kyoto), S.T.Yau (Harvard). There will also be sessions for shorter, contributed talks.

Enquiries: For further information about the conference (including financial assistance to regional participants), please send your enquiries to:

Pacific Rim Geometry Conference, Department of Mathematics, National University of Singapore, Singapore, 0511, Republic of Singapore. E-mail: matprgc@nusunix.nus.sg

---

POLAND

Stefan Banach International Mathematical Center
25 Mokotowska Str., Warsaw, Poland

Banach Center Semester

on

NONLINEAR ANALYSIS

September - December, 1994

Coordinators: B. Bojarski, K. Gęba, A. Granas

Topological and Variational Methods in Nonlinear Analysis

September 5 - 17
Organizers: K. Gęba, T. Bartsch, W. Marzantowicz, S. Rybicki

Methods of Critical Point Theory in Nonlinear Problems

September 26 - October 7
Organizers: A. Granas, A. Marino, J. Mawhin

Topological Methods in Differential Inclusions

October 10 - 15
Organizers: F. De Blasi, L. Górniewicz, P. Nistri

Nonlinear PDE's and Equations of Mathematical Physics

October 17 - November 10
Organizers: B. Bojarski, W. Zajączkowski

Nonlinear Analysis and Applications

November 14 - December 16
Organizers: N. Kenmochi, M. Niezgódka

SWEDEN

PROGRESS IN INVERSE SPECTRAL GEOMETRY   FIRST ANNOUNCEMENT

An International Conference and Summer School

SUMMER UNIVERSITY OF SOUTHERN STOCKHOLM

Date:	**27 June - 2 July 1994**
Location:	**Novum Research Park, Nova Park Hotel, Huddinge (Stockholm), Sweden.**

This combined conference/summer school will emphasize various aspects of the traditional isospectrality question.   Topics covered will include non-compact manifolds, singular manifolds, inverse spectral geometry for foliations and fractal sets, finite spectral geometry and LP spectral geometry for forms.

The invited lecturers will speak primarily in the mornings, with the remaining time devoted to research expositions of the participants own work.

Enrollment deadline: 1 June 1994   **Enrollment fee:** SEK 4500/SEK 2250 (students)

Organizer: Stig I. Andersson, Chalmers Science Park, S-412 88 GÖTEBORG, Sweden.
Phone: +46 31 772 4284   Fax: + 46 31 827421

Invited speakers and titles:

Pierre H.Bérard (Inst.Fourier,Grenoble): *(Title to be announced)*

Peter Buser (Ecole Polytechnique, Lousanne): *"Isospectrality of surfaces" "On lengths spectra of compact Riemannian surfaces"*

Carolyn S.Gordon (Mathematical Sciences Res.Inst.,Berkeley) *(Title to be announced)*

Michael L.Lapidus (Univ.of California,Riverside): *"Lectures on spectral and fractal geometry - can one hear the shape of a fractal drum? From the Weyl-Berry conjecture to the Riemannian hypothesis"*

Lieven Vanhecke (Catholic Univ.,Leuven): *"Curvature of Riemannian manifolds" "Symmetric-like Riemannian spaces"*

Toshikazu Sunada (Tôkhoku Univ.,Sendai): *"Periodic magnetic Schrödinger operators"*

THE NETHERLANDS

MATHEMATICAL METHODS IN INDUSTRIAL PROBLEMS:

Multiscale Analysis in Image Processing   Lunteren, The Netherlands

Date:	**15 - 20 October 1994**
Location:	**Lunteren, The Netherlands**
Speakers:	V.Alvares *(Las Palmas)*. V.Caselles *(Palma)*, R.Devore *(Columbia)*, J.J.Koenderink *(Utrecht)*, J-M.Morel *(Paris)*, L.Rudin *(Santa Monica)*, J.Welckert *(Kalserslautern)*, G.Barles *(Tours)*, R.Coifman *(New Haven)*, O.Faugeras *(Nice)*, C.Lopez *(Paris)*, B.M.Ter Haar Romeny *(Utrecht)* S.Solimini *(Lecce)*.

The conference will focus on the use and analysis of mathematical methods in Image Processing with a particular emphasis on multiscale methods (e.g. scale space, wavelets and wave packets). Mathematically proven methods and algorithms are receiving more and more attention in Image Processing, Computer Vision and their applications (in medical industrial domains, etc.). The programme will combine state of the art surveys and research presentations that should provide a broad basis for reflection and discussion, and hopefully stimulate novel approaches.

Deadline for applications: 10 June 1994. The number of participants will be limited to 100. There will be a Registration Fee covering full board and lodging. Some grants will be available for younger scientists, in particular those from less favoured regions in Europe.

In association with the European Mathematical Society

Contact:	For information & application forms, Executive Director of the Programme: Dr.Josip Hendekovic, European Science Foundation, 1 quai Lezay-Marnésia, 67080 Strasbourg Cedex, France. Tel: (33) 88 76 71 35 Fax. (33) 8836 69 87

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, 18600 Praha 8, Czech Republic.

M.Farge, J.C.R.Hunt, J.C.Vassilicos (Eds.): Wavelets, Fractals, and Fourier Transforms, The Institute of Mathematics and its Applications, Conference Series, vol.43, Clarendon Press, Oxford, 1993, xv+403 pp., ISBN 0-198-53647-X

This book represents the Proceedings of the international conference on wavelets, fractals and Fourier transforms held at Newnham College (Cambridge) in December 1990. In the preface the editors describe briefly the contents of the contributed papers. The material is divided into three sections. Section 1 includes 8 papers presenting underlying ideas behind the techniques of describing signals in terms of wavelets and Fourier transform; the following topics are also treated: wavelet transform of measures, use of wavelets in detecting and analysing points where functions are singular, image processing, biorthogonal wavelets, functional Brownian motion, Gibbs phenomenon and analysis of well logs. Section 2 comprises 5 contributions applying wavelet transform in analysis of mammalian visual system, universe heterogeneities and astronomical image analysis, flow around Antarctica and quantification of scale cascades in the stratosphere. Section 3 contains 13 papers mostly devoted to applications of wavelets and fractals in turbulence and also in electrical engineering, fractal models of density interfaces, fractal aggregates in the atmosphere, morphology and investigation of disordered inhomogeneous materials. While applications of Fourier methods are classical, the practical use of fractals and wavelets has been developed relatively recently. The interest in these topics is rapidly growing which is well documented by the present book; the reader will find many additional related references in the papers included in this volume. (jokr)

J.M.Ruiz: The Basic Theory of Power Series, Advanced Lectures in Mathematics, Friedrich Vieweg & Sohn, Wiesbaden, 1993, x+134 pp., DM 36.00, ISBN 3-528-06525-9, ISBN 3-528-06525-7

The book covers in a concise, elementary and understandable form basic power series techniques commonly used both in real and complex analytic geometry and in algebraic geometry. The material is explained in an almost self-contained way and in geometric rather than algebraic terms. The text, besides the usual background, presents various Nullstellensätze, Artin's Approximation Theorem, Zariski's Main Theorem and other material which will be of help to those who are interested in commutative algebra and/or analytic geometry. (tk)

G.E.Bredon: Topology and Geometry, Graduate Texts in Mathematics, vol.139, Springer-Verlag, New York, 1993, xiv+557 pp., 85 fig., DM 118.00, ISBN 0-387-97926-3, ISBN 3-540-97926-3

This book would be a nice textbook for a graduate course on algebraic topology strongly influenced by smooth manifold theory. The book begins with a nicely chosen and well presented review of general topology and the theory of differentiable manifolds. The third chapter contains the properties of the fundamental group of a topological space and its relations with covering spaces and deck transformations. The next two chapters are devoted to homological and cohomological theories. The author uses mainly singular homology, CW-complexes and cellular homology but also basic simplicial homology and their applications. In the chapter on cohomology, the de Rham cohomology theory on manifolds is described first and then singular cohomology is studied. The de Rham theorem is proved here and some of its applications are presented. In the sixth chapter, various kinds of products available in homology and cohomology theories are discussed. Very important results on Poincare duality for manifolds are presented and proved here. At the end of the chapter, several related topics such as intersection theory, Steenrod operations, Euler class and Stiefel-Whitney classes are studied. The last chapter contains advanced homotopy theory including cofibrations, H-spaces, Hurewicz and Whitehead theorems, Eilenberg-McLane spaces and obstruction theory. The book can be warmly recommended to anyone interested in algebraic topology. (jbu)

E.Çinlar, K.L.Chung, M.J.Sharpe (Eds.): Seminar on Stochastic Processes, 1992, Progress in Probability, vol.33, Birkhäuser, Boston, 1993, vi+276 pp., sFr 144.00, ISBN 0-8176-3649-8, ISBN 3-7643-3649-8

The Seminars on Stochastic Processes are a series of annual meetings. The book contains a selection of papers presented at the twelfth Seminar held at the University of Washington in 1992. The invited paper by R. J. Adler deals with superprocesses and with local time. The former are also the subject of the paper by A. M. Etheridge, the latter of the papers by R. Bass, D. Khoshnevisan, M. B. Marcus and J. Rosen. Invariance principles for local times are the main topic of these papers. The book includes contributions to martingale problems, to the solution of stochastic evolution equations and to the theory of Schrödinger semigroups. Two papers are devoted to random

walks. Further topics dealt with are iterated Brownian motion, Markovian bridges, random walks, branching processes, and the two-armed bandit problem. (pm)

P.Prasad: Propagation of a Curved Shock and Nonlinear Ray Theory, Pitman Research Notes in Mathematics, vol.292, Longman Scientific & Technical, Harlow, 1993, xii+124 pp., GBP 22.00, ISBN 0-582-07253-0

The monograph deals with nonlinear shock and wave propagation problems. The method of attacking the problems consists of deriving infinitely many compatibility conditions on a shock surface and on the wavefront. This system is truncated to a finite number of ordinary differential equations and it is shown that it provides a good method for finding successive positions of a shockfront and distribution of a shock strength on them. A comparison of numerical results with an exact solution and an application to a one-dimensional piston problem is also given. The nonlinear ray theory for short waves developed in this way can be interpreted as an extension of Huyghens' method of wavefront construction. The theory also provides a tool for solving problems like focusing and defocusing of nonlinear waves and shockfronts. The book starts with an introduction to the shock wave theory and will be useful for research workers in nonlinear waves, shock propagation, gas dynamics and mathematical physics. (hp)

Zhe-xian Wan: Introduction to Abstract and Linear Algebra, Chartwell-Bratt, Bromley, 1992, v+369 pp., GBP 29.95, ISBN 0-862-38316-1

This is an introductory text in algebra and linear algebra for undergraduate engineering students. The presentation is self-contained, assuming only high school knowledge of mathematics. The text contains all the standard material about groups, fields, matrices, and polynomials. The parts of linear algebra which are of a more geometric nature (e.g. Euclidean and unitary spaces) are not included. The presentation concentrates on finite fields, polynomials and commutative rings. Section 4.3 contains a beautiful presentation of the Chinese Remainder Theorem, going back to Sun-Zi, 3-5 century AD. The highlights of the text are structure theorems for finite fields and a detailed analysis of polynomials over finite fields, their factorization (Berlekamp's algorithm) and irreducibility. Moreover, tables of irreducible polynomials over Z_2 are included. The presentation deserves one more chapter dedicated to an introduction to linear codes and the role the above mentioned notions play there. Such a chapter would surely increase the attractivity of this nice book to students of engineering. (It seems likely that there was a chapter like this in the original text "Algebra and Coding Theory" (in Chinese), the translated and revised version of which constitutes the present book.) (jt)

D.Goss, D.R.Hayes, M.I.Rosen: The Arithmetic of Function Fields. Proceedings of the Workshop at the Ohio State University, June 17-26, 1991, Walter de Gruyter, Berlin, 1992, viii+482 pp., DM 138.00, ISBN 3-110-13171-4

This collection of articles is intended for both experts in and students of number theory. Its central topic is the arithmetic of Drinfeld modules, a relatively recent subject in which analogues of well known arithmetic objects are studied over function fields. This volume contains several carefully written expositions of the foundations of the theory of Drinfeld modules (exponentials, class field theory, rigid geometry, moduli spaces) as well as papers that further develop analogies between number fields and function fields (gamma functions, elliptic units, modular forms, L-series). (jn)

F.Q.Gouvêa: p-adic Numbers. An Introduction, Universitext, Springer-Verlag, Berlin, 1993, vi+282 pp., 15 fig., DM 58.00, ISBN 3-540-56844-1, ISBN 0-387-56844-1

The aim of this book is to give an elementary introduction to p-adic analysis, accessible to undergraduate students. It presents p-adic numbers at first as quite concrete objects in terms of their p-adic expansions. After explaining basic facts about valuations, Q_p is constructed in a more sophisticated way as a completion of Q in the p-adic metric. The author then proves Hensel's lemma, discusses the local-global principle and introduces elementary analysis in Q_p. In the final two chapters, algebraic extensions of Q_p and the p-adic analogue C_p of the field of complex numbers are studied (including power series and their Newton polygons). Two appendices contain hints to many problems included in the book and comments on further reading. The book is very well written and can be used as an excellent basis for an undergraduate course. (jn)

P.M.Gruber, J.M.Wills (Eds.): Handbook of Convex Geometry. Volume A, North-Holland, Amsterdam, 1993, 816 pp., $ 168.50, ISBN 0-444-89596-5, ISBN 0-444-89598-1

P.M.Gruber, J.M.Wills (Eds.): Handbook of Convex Geometry. Volume B, North-Holland, Amsterdam, 1993, 780 pp., $ 162.75, ISBN 0-444-89597-3, ISBN 0-444-89598-1

This is an excellent survey of convex geometry and its relation to various mathematical disciplines. In total 1438 pages are devoted to an exposition of a majority of the branches of contemporary convexity. Volume A consists of 21 high-level survey articles, 11 of them concentrating on classical convexity, 9 on combinatorial aspects of convexity and one article brings a nice overview of the historical development of convexity. Volume B consists of 7 articles on discrete aspects of convexity, 10 articles on analytic aspects of convexity and, finally, 2 contributions on stochastic aspects of convexity. Each of the 40 articles is written by an expert in the field and represents a top-level introduction to a single subject of convexity. Areas of convexity not covered in the Handbook include Choquet theory and axiomatic convexity. This work, without doubt, will become an indispensable source book for anybody interested in convexity: an important reference book for specialists as well as an introductory text for those making acquaintance with this beautiful field. In view of relationship of convexity to geometry, discrete mathematics, analysis (and other parts of mathematics) and thanks to the wide scale of applications, the Handbook will be appreciated not only by a wide spectrum of mathematicians, but also computer scientists, physicists, econometrists and researchers from other fields. The high quality of this two-volume treatise will attract attention of a vast community of readers. (in)

H.Esnault, E.Viehweg: Lectures on Vanishing Theorems, DMV Seminar, Band 20, Birkhäuser, Basel, 1992, 164 pp., DM 56.00, ISBN 3-764-32822-3, ISBN 0-817-62822-3

This book presents a purely algebraic approach to fundamental vanishing theorems (due to K.Kodaira) and Y.Akizuki and S. Nakaro (in the complex analytic case) for cohomology of line bundles on smooth projective varieties. It combines previous work of the authors on logarithmic de Rham cohomology with results of P.Deligne and L.Illusie on the degeneration of the Hodge-de Rham spectral sequence. The book is very clearly written; it requires from the reader a certain background in algebraic geometry, but most techniques used are explained in the text. (jn)

J.Heinonen, T.Kilpelinen, O.Martio: Nonlinear Potential Theory of Degenerate Elliptic Equations, Oxford Mathematical Monographs, Clarendon Press, Oxford, 1993, v+363 pp., GBP 40.00, ISBN 0-198-53669-0

The method of sub/supersolutions yields good results in the investigation of quasilinear second order elliptic equations. This indicates the possibility of developing a potential theory for such equations. In many directions the results of nonlinear potential theory follow what has been done for the Laplace equation. Notions like superharmonic functions, capacity, thinness, balayage, polar sets, fine topology, quasitopology and the Perron method for the Dirichlet problem are succesfully studied. Comparison and lattice methods are customary here as elsewhere in potential theory. On the other hand, the integral representation using Green's functions is not available. The lack of linearity forces one to employ different techniques like obstacle problems via monotone operators or Moser's iteration. The equations under investigation are $-\mathrm{div}(A(\mathrm{x},\nabla\mathrm{u})) = 0$, where $A(x,\xi)\cdot\xi$ has the same growth as $|\xi|^p$, $1 < p < \infty$, and their continuous solutions are called A-harmonic functions. The model equation is the p-Laplace equation with $A(x,\xi) = |\xi|^{p-2}\xi$, and appears as the Euler equation of the p-Dirichlet integral $\int_\Omega |\nabla u|^p \, dx$ and thus plays a key role in understanding the Sobolev space $W^{1,p}(\Omega)$. In the book even greater generality is achieved by associating the class of equation with a weighted Sobolev space. The weights are assumed to satisfy certain axioms and includes the case of Muckenhoupt's A_p-weights. Another direction which needs to be supported by a good background of nonlinear potential theory is the theory of quasiconformal and quasiregular mappings (here $p = n$). This link is well studied in the book; among others it is shown that quasiregular mappings are morphisms of the following type: each function A satisfying the growth assumptions together with a quasiregular mapping f determine a function A' satisfying the growth assumptions so that if u is A-harmonic, then $u \circ f$ is A'-harmonic. The book is warmly recommended to specialists in potential theory, elliptic PDE's, Sobolev spaces and quasiconformal mappings. (jma)

H.Brezis, J.L.Lions (Eds.): Nonlinear Partial Differential Equations and their Applications. College de France. Seminar Volume XI, Pitman Research Notes in Mathematics Series, vol.299, Longman Scientific & Technical, Harlow, 1994, 311 pp., GBP 43.00, ISBN 0-582-23800-5

This volume consists of 14 lectures held during 1989-1991 at the weekly Seminar on Applied Mathematics at the Collège de France. The contributions are written as articles and include proofs and other details. The spectrum of problems studied is very large and some lectures are outside the framework of nonlinear PDE's. Lectures devoted to evolution PDE's are presented by M.Ben-Artzi (regularity, linear theory), H.Le Dret (elastodynamics), M.G.Garroni, V.A.Solonnikov and M.A.Vivaldi (nonlinear integro-differential equations), G.Raugel and G.R.Sell (Navier-Stokes equation), D.Serre (nonlinear hyperbolic systems and conservation laws) and M.Vanninathan. Y.Brenier studies polar factorization and rearrangement methods with applications involving the Monge-Ampère equation. Numerical analysis is represented by C.Bernardi, Y.Maday and T.Patera (mortar elements) and S.Jaffard (wavelets). Stability and control theory for systems of ordinary differential equations is studied by J.M.Coron. The lecture by B.Dacorogna deals with variational calculus of quasiconvex functionals and jacobians. The paper by D.Kinderlehrer and P.Pedregal is devoted to Young measures. J.M.Morel applies nonlinear evolution equations to problems of segmentation of images. L.Tartar presents H-measures as a tool in homogenization theory. The book is recommendable for specialists and postgraduate students interested in applied mathematics. The Seminar on Applied Mathematics has a leading position in the field and the list of papers is very representative. (jma)

T.W.Körner: Exercises for Fourier Analysis, Cambridge University Press, Cambridge, 1993, x+385 pp., GBP 35.00, ISBN 0-521-43276-6, ISBN 0-521-43849-7

The author's book Fourier Analysis (Cambridge University Press, 1988) has no exercises. This volume provides the necessary exercises to the book. The material presented in this exercise volume is closely related to the original text, references are given to the text and both volumes together represent a unit. From this point of view this single volume is not self-contained. A large variety of exercises is presented in the book. There is a wide choice for the teacher as well as for the student. There are more than 100 units (some of them in two steps) containing material which can be worked out. The author's aim is not to present problems, exercises are the main goal of the book. The student can go through the contents to find questions of interest and work on them. The construction of the exercises allows one to acquire fundamental abilities, knowledge or technique and deeper understanding as well. Alternative proofs are given for results presented in the original textbook, and historical remarks which can stimulate further reading are also given. Many questions have their origin in mathematical physics. The present book seems to be a very useful supplement to the original book of T.W. Körner. It will clearly help the student to gain a deep understanding of the broad field of Fourier analysis in a comtemporary setting. (ss)

A.Ambrosetti, V.Coti-Zelati: Periodic Solutions of Singular Lagrangian Systems, Progress in Nonlinear Differential Equations and Their Applications, vol.10, Birkhäuser, Boston, 1993, vi+157 pp., sFr 78.00, ISBN 0-8176-3655-2, ISBN 3-7643-3655-2

The material presented in this book has been presented by the authors in a series of lectures at SISSA, Trieste. It covers the existence of periodic motions of Lagrangian systems with n degrees of freedom of the form $\ddot{q} + V'(q) = 0$, where V is a singular potential. The approach of the authors is based mainly on nonlinear functional analysis. Critical point theory is the main tool for obtaining existence results. The prototype for the problems dealt with is the case of the Kepler potential. After a motivating introductory chapter the special properties of singular potentials are described. The strongly attractive case (with the Palais - Smale condition) and the weakly attractive case are studied for obtaining orbits with a fixed period. Then the problem of finding periodic orbits for systems having prescribed energy is dealt with. The N-body problem and perturbation methods conclude this interesting research monograph. (ss)

Seppo Rickman: Quasiregular mappings, Ergebnisse der Mathematik und ihrer Grenzgebiete, 3. Folge, Band 26, A Series of Modern Surveys in Mathematics, Springer-Verlag Berlin Heidelberg New York, x+213 pp., DM 128.00, ISBN 3-540-56648, 0-387-56648

A continuous weakly differentiable mapping f of an open domain $G \subset \mathbf{R}^n$ into $\mathbf{R}^n$ is termed quasiregular, if its derivative Df is in $L^n_{\mathrm{loc}}(G)$ and satisfies the inequality $|Du| \leq K \det Du$ almost everywhere for some constant K, $1 \leq K < \infty$. As a limit case when $K = 1$ we obtain just analytic functions in the two-dimensional space and Möbius transforms (or constants) in higher dimensions. Quasiregular homeomorphisms are quasiconformal mappings. Rickman's book is the third monograph devoted to quasiregular mappings (not taking into account volumes on quasiconformal mappings). Nevertheless, it covers mostly new material and yields a valuable source of information on the present stage of development of the theory. The presentation is based on the method of

extremal length and modulus. Among the main results we mention the defect relation in value distribution theory, which says considerably more than Picard-type theorems. Attention is also paid to variational integrals of growth n and to boundary behaviour theory. Although the exposition is far reaching in selected streams, the reader can find basic information about all important topics concerning quasiregular mappings. The theory has close links with topology, geometry and real analysis of several variables, nonlinear potential theory and complex analysis. The book is thus strongly recommended to a wide range of specialists. (jma)

R.V.Goldstein, V.M.Entov: Qualitative Methods Continuum Mechanics, Pitman Monographs and Surveys in Pure and Applied Mathematics, vol.72, Longman Scientific & Technical, Harlow, 1994, 279 pp., GBP 48.00, ISBN 0-582-08372-9

This book gives a presentation of several basic approaches and techniques for using the integral functionals of solutions of some problems in continuum mechanics. The purpose is to derive estimates of local and integral quantities of interest and to avoid the necessity for a detailed solution of the problem. Two main topics are treated here: problems of fluid flow through porous media and problems from elasticity and fracture mechanics. The first two chapters are concerned with minimum principles in seepage theory and qualitative methods for flows of visco-plastic fluids through porous media. Chapters 3-10 are devoted to problems from elasticity, namely crack theory, approximations of stress intesity factor, conditions of fracture and torsion problems. The book will be of interest to researchers in continuum mechanics, applied mathematics, mechanical engineering and hydrology. (mf)

L.Quartapelle: Numerical Solution of the Incompressible Navier-Stokes Equations, International Series of Numerical Mathematics, vol.113, Birkhäuser, Basel, 1993, xii+291 pp., sFr 128.00, ISBN 3-764-32935-1, ISBN 0-817-62935-1

This book represents an introduction to methods for the solution of problems with incompressible viscous non-stationary flow. The author tries to give a unitary view of the methods which reduce the equations of viscous incompressible flow to a system of second-order equations of parabolic or elliptic type. Therefore, the special methods such as finite difference, finite element or spectral methods are not treated here in detail, but a series of possible reformulations of the Navier-Stokes equations is given and the equivalence with the original Navier-Stokes problem is studied. The book describes a large number of various approaches based on nonprimitive variables as stream function, vorticity, potential etc. in 2D and 3D, as well as the use of primitive velocity and pressure variables. The reader can become familiar with various projection and fractional step methods. It is a pity that the book does not contain some numerical examples which would demonstrate the numerical realization, efficiency and robustness of the methods discussed in the book. The book is clearly written, easy to read and understand. It can be recommended to all researchers interested in computational fluid dynamics, including graduate students. (mf)

W.de Melo, S.van Strien: One-Dimensional Dynamics, Ergebnisse der Mathematik und ihrer Grenzgebiete. Band 25 A Series of Modern Surveys in Mathematics, Springer-Verlag, Berlin, 1993, xiii+605 pp., 89 fig., DM 148.00, ISBN 3-540-56412-8, ISBN 0-387-56412-8

The monography presents a self-contained overview of one-dimensional dynamics. At first, the authors exhibit the theory of circle diffeomorphisms and then they develop an analogous theory for the non-invertible case. They try to give a unified account of the subject. The book is divided into six chapters (preceded by Introduction and followed by Appendix): 1. Circle diffeomorphisms, 2. The combinatorics of one-dimensional endomorphisms, 3. Structural stability and hyperbolicity, 4. The structure of smooth maps, 5. Ergodic properties and invariant measures, 6. Renormalization. In 605 pages, the authors have brought together results not easily accessible elsewhere, with complete proofs. The book is nicely written and leads the reader to the frontiers of research. (dv)

M.Katětov, P.Simon (Eds.): The Mathematical Legacy of Eduard Čech, Birkhäuser, Basel, 1993, 448 pp., DM 138.00, ISBN 3-764-32861-4, ISBN 0-817-62861-4

This book appeared on the occasion of the centenary of Eduard Čech's birth. It is divided into four parts: Čech-Stone compactification (P. Simon), Dimension theory (M. Katětov), Algebraic topology (E. G. Skljarenko), Differential geometry (I. Kolář). Each part contains Čech's most important papers in the corresponding field and a summary of work (up to present time) related to them (several such related papers are included). At the end, a brief description of Čech's activity in the didactics of mathematics is added. (mh)

W.Koepf, A.Ben-Israel, B.Gilbert: Mathematik mit Derive, Friedrich Vieweg & Sohn, Braunschweig, 1993, xiv+394 pp., 80 fig., DM 49.80, ISBN 3-528-06549-4

This is a modern textbook of calculus, making extensive use of the Computer Algebraic System (CAS) DERIVE. It covers standard topics of the analysis of one variable: sets and numbers, Euclidean space, functions and plots, sequences and their convergence, elementary transcendental functions, power series, continuous functions, Riemann integral, basic techniques of numerical integration, derivatives, global properties of differentiable functions, indefinite integral, uniform convergence. A useful Appendix containing the basics of DERIVE forms the last part of the book. Whenever it is reasonable to demonstrate the principles of calculus via CAS, DERIVE is employed. The use of DERIVE is kept within elementary limits but some simple programmed examples are also given. The book is carefully written and rich in the selected material. Recommended to everybody. (jh)

A.J.P.Watkins: Derive-based Investigations for Post-16 Core Mathematics. 2nd Edition, Chartwell-Bratt, Bromley, 1993, 102 pp., GBP 9.95, ISBN 0-862-38312-9

DERIVE, A Mathematical Assistant, is one of several packages intended for both symbolic and numerical calculations providing the user with reasonable graphical possibilities. This booklet is designed to introduce the reader to this package and to some of the concepts of advanced mathematics. The topics covered are as follows: Getting started; Elementary graphics; An introduction to elementary calculus; The graphical features of reciprocal functions; The graphical features of trigonometric function; The graphical features of exponential and logarithmic function; Limits and differentiations; Introducing differential equations; Combining oscillations; Numerical methods: The Newton-Raphson iterative methods and a general iterative method; Selected functions and their series expansions. The level is *very* elementary, say that of the better scientific calculator. For each chapter the exercises with solutions are available. This book is certainly not suitable for those wishing to master the DERIVE package for solving difficult problems. On the other hand, it can be used for students who are starting a mathematical analysis course at technical universities. I regret that I found neither the contents nor index. (jant)

M.Hucek, J.van Mill (Eds.): Recent Progress in General Topology, North-Holland, Amsterdam, 1992, xii+796 pp., $ 143.00, ISBN 0-444-89674-0

The Prague Topological Symposia, held each fifth year since 1961, have gained a good reputation among the topological community. Since the number of participants is constantly increasing, it turned out in 1991 that the publication of the standard type of proceedings was beyond the abilities of the organizers. Instead, they decided to ask prominent specialists for a detailed survey of new results in their area of interest. The book under review is the result. It contains 20 chapters written by 29 mathematicians, covering general topology in a wide range: from Set Theory in Topology to Continuum Theory, including Banach Spaces, Topological Differentiation Theory and Topological Dynamics. Naturally, the less exotic parts of general topology, like Compact Spaces, Descriptive Theory, Extension of Mappings, are treated, too. We shall not give a complete contents of this comprehensive book, preferring to quote from Mary Ellen Rudin's Introduction: "... not all appropriate General Topology topics can be covered by this volume. This does not destroy the value of this volume. Here you will find a remarkably broad vision of recent developments in General Topology with special insight from some of the best men working in the field. It is a vision first seen by those attending Toposym 1991. It is an educational summing up." (ps)

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

The fifth volume of the Encyclopaedia series in several complex variables describes three very interesting topics. The first one (written by Berenstein and Struppa) discusses the Ehrenpreis-Palamodov Fundamental Principle for solutions of linear PDE's with constant coefficients and its extensions to the case of convolution equations. The paper contains an extensive bibliography (more than 25 pages). The second part (by Khenkin and Novikov) describes a topic from twistor theory, namely the description of solutions of the Yang-Mills-Higgs-Dirac equations by holomorphic vector bundles over the ambitwistor space of complex null lines and the connection between the Radon-Penrose transform on the ambitwistor space and the Fadeev type scattering data. The last part (written by Morozov and Perelomov) treats some topics in string theory related to complex geometry. It includes a discussion of Dirac (i.e. Cauchy-Riemann) operators on Riemann surfaces and their determinants, the moduli space of Riemann surfaces and its compactification and calculation of the Mumford measure. As is standard in the Encyclopeadia volumes, the style is that of a survey paper. The reader can find a nicely written and a well-documented overview of the subject describing and explaining results but giving no proofs. The book will be very useful for anybody interested in complex geometry and related mathematical physics. (vs)

G.A.Niblo, M.A.Roller (Eds.): Geometric Group Theory. Proceedings of the Symposium held in Sussex 1991. Volume 1, London Mathematical Society. Lecture Notes Series 181, Cambridge University Press, Cambridge, 1993, 212 pp., GBP 22.95, ISBN 0-521-43529-3

G.A.Niblo, M.A.Roller (Eds.): Geometric Group Theory. Proceedings of the Symposium held in Sussex 1991. Volume 2: Asymptotic Invariants of Infinite Groups, M.Gromov, London Mathematical Society. Lecture Notes Series 182, Cambridge University Press, Cambridge, 1993, vii+295 pp., GBP 22.95, ISBN 0-521-44680-5

These two volumes are a collection of papers related to the Geometric Group Theory Symposium held in Sussex in the summer 1991. In the first volume, there are two types of contributions. One type consists of surveys of some special topics giving a nice overview of the field, the other type consists of papers based on lectures given at the symposium. The following subjects are covered by the survey papers: Group actions and Riemann surfaces (A.F.Beardon); The geometric invariant of a group (R.Bieri); String rewriting (D.E.Cohen); Isoperimetric and isodiametric functions of finite presentations (S.M.Gersten); On Hilbert matrix for simplices (P.de la Harpe); Brick's quasi simple filtrations and 3-manifolds (J.R.Stallings). Problems discussed at the Symposium are collected at the end of this volume . The entire second volume consists of the article by Michael Gromov: "Asymptotic Invariants of Infinite Groups". It contains a nice survey of the topic and many new ideas for further research. There are parts devoted to the asymptotic methods, asymptotic cones, distortion, filling invariants, semi-hyperbolic spaces, hyperbolic groups and L_p-cohomology . Both books are very interesting and useful for all mathematicians interested in this field involving both Groups and Geometry. (jbu)

A.L.Onishchik (Ed.): Lie Groups and Lie Algebras I. Foundations of Lie Theory. Lie Transformation Groups, Encyclopaedia of Mathematical Sciences, vol.20, Springer-Verlag, Berlin, 1993, vii+235 pp., DM 141.00, ISBN 0-387-18697-2, ISBN 3-540-18697-2

This volume consists of two parts. Part I - Foundations of Lie Theory by A. L. Onishchik and E. B. Vinberg, Part II - Lie Transformation Groups by V. V. Gorbatsevich and A. L. Onishchik. Part I is devoted to a systematic development of the theory of Lie groups. The Lie algebras are studied only in connection with Lie groups, i.e. a systematic study of the Lie algebras is included here. Neither the structural theory of the Lie groups and Lie algebras nor a systematic study of the topology of Lie groups form the subject of this volume. On the other hand, Part I contains a very interesting chapter on generalizations of Lie groups including very recent results. We find here Lie groups over non-archimedian fields, formal groups, infinite dimensional Lie groups and also analytic loops. Part II deals on an advanced level with actions of Lie groups on manifolds and includes subjects like Lie groups actions on manifolds, transitive actions, actions of compact Lie groups, homogeneous spaces of nilpotent and solvable groups, compact homogeneous spaces and actions of Lie groups on low-dimensional manifolds. Though the authors state that the geometry and topology of Lie groups is almost entirely beyond the scope of this survey, one can learn a lot in these directions. Both parts are very nicely written and can be strongly recommended. (jiva)

CAMBRIDGE

New Mathematics titles from Cambridge

Finite Geometries and Combinatorics

Edited by F. DE CLERCK, J. HIRSCHFELD, ALBRECHT BEUTELSPACHER, FRANCIS BUEKENHOUT, JEAN DOYEN and JOSEPH A. THAS

This is a collection of 35 articles on covering topics such as finite projective spaces, generalised polygons, strongly regular graphs, diagram geometries and polar spaces.
£27.50 net   PB   0 521 44850 6   424 pp.   1993
London Mathematical Society Lecture Note Series 191

Computational Algebraic Geometry and Commutative Algebra

Cortona 1991
Edited by DAVID EISENBUD and LORENZO ROBBIANO

Includes the most interesting trends and developments in the field, as well as an introduction to the theory of Gröbner bases and their use in computation.
£29.95 net   HB   0 521 44218 4   308 pp.   1993
Symposia Mathematica 34

Locally Presentable and Accessible Categories

J. ADAMEK and J. ROSICKY

The aim of this book is to provide an exposition of both the theory and the applications of these categories at a level accessible to graduate students.
£25.00 net   PB   0 521 42261 2   330 pp.   1994
London Mathematical Society Lecture Note Series 189

Neural Networks and Qualitative Physics

A Viability Approach
JEAN-PIERRE AUBIN

This book is devoted to mathematical methods (control and viability theory, set-valued analysis, etc.) arising in such domains of artificial intelligence.
£29.95 net   HB   0 521 44532 9   288 pp.   1994

Phyllotaxis

A Systemic Study in Plant Morphogenesis
ROGER V. JEAN

This book is the first to deal with phyllotaxis, the study of the patterns determined by leaves, petals, and other plant organs in an integrated manner.
£45.00 net   HB   0 521 40482 7   400 pp.   1994

Microlocal Analysis for Differential Operators

An Introduction
ALAIN GRIGIS and JOHANNES SJÖSTRAND

An excellent introduction to the study of microanalysis based on a lecture course given by the authors.
£19.95 net   PB   0 521 44986 3   176 pp.   1994
London Mathematical Society Lecture Note Series 196

Now in paperback
Some Random Series of Functions

Second Edition
JEAN-PIERRE KAHANE

This second edition covers random series in Banach and Hilbert spaces, random Taylor or Fourier series, Brownian Motion and other Gaussian processes, plus certain types of random sets and measures.
£19.95 net   PB   0 521 45602 9   316 pp.   1993
Cambridge Studies in Advanced Mathematics 5

The Riemann Approach to Integration

Local Geometric Theory
WASHEK F. PFEFFER

This book presents a detailed and mostly elementary exposition of the generalised Riemann–Stieltjes integrals discovered by Henstock, Kurzweil, and McShane.
£30.00 net   HB   0 521 44035 1   320 pp.   1994
Cambridge Tracts in Mathematics 109

Squares

A. R. RAJWADE

The author deals with many different approaches to the study of squares from the classical works of the late 19th century, to areas of current research. Anyone with an interest in algebra or number theory will find this a most fascinating volume.
£27.50 net   PB   0 521 42668 5   304 pp.   1993
London Mathematical Society Lecture Note Series 171

Elementary Probability

DAVID STIRZAKER

The text provides numerous worked examples and exercises all of which help build up the skills necessary for problem solving, as well as demonstrate the concepts involved.
£45.00 net   HB   0 521 42028 8   416 pp.   1994
£15.95 net   PB   0 521 42183 7

The Algebraic Theory of Modular Systems

F. S. MACAULAY

Introduction to this edition by PAUL ROBERTS, University of Utah

Originally published over 75 years ago, the wealth of thinking expounded here by Macaulay will still be a source of inspiration to all workers in commutative algebra.
£12.95 net   PB   0 521 45562 6   144 pp.   1994
Cambridge Mathematical Library

An Introduction to Homological Algebra

C. WEIBEL

This book paints a portrait of the subject of homological algebra as it exists today. The historical connection with topology, regular local rings, and semi-simple lie algebras are also described.
£55.00 net   HB   0 521 43500 5   448 pp.   1994
Cambridge Studies in Advanced Mathematics 38

Arithmetic of Blowup Algebras

WOLMER V. VASCONCELOS

For students and experts in commutative algebra, algebraic geometry, homological algebra and computational algebra, this book is a reference in the theory of Rees algebras and related topics.
£22.95 net   PB   0 521 45484 0   352 pp.   1994
*London Mathematical Society Lecture Note Series 195*

Arithmetical Functions

WOLFGANG SCHWARZ and J. SPILKER

The goal of this book is the characterization of certain multiplicative and additive arithmetical functions.
£25.00 net   PB   0 521 42725 8   388 pp.   1994
*London Mathematical Society Lecture Note Series 184*

Banach Algebras and the General Theory of *-Algebras

Volume 1: Algebras and Banach Algebras
THEODORE W. PALMER

This is the first volume of a two volume set that provides a modern account of basic Banach algebra theory including all known results of general Banach *-Algebra.
£60.00 net   HB   0 521 36637 2   800 pp.   1994
Encyclopedia of Mathematics 49
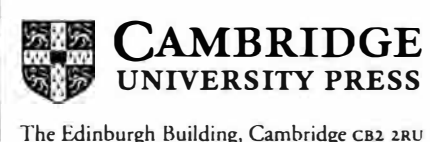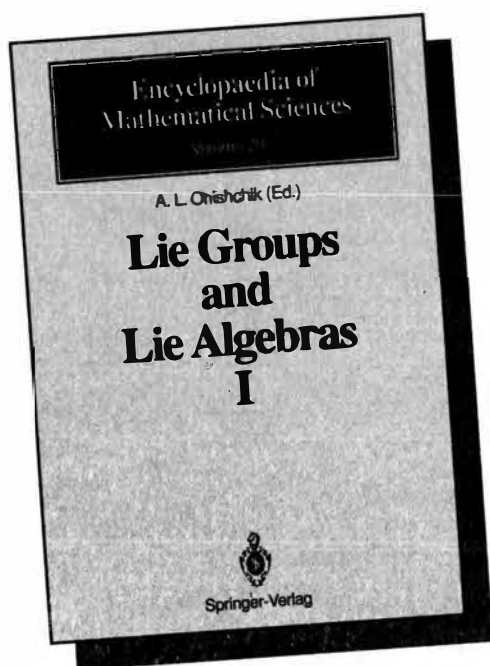
A. L. Onishchik (Ed.)

Lie Groups and Lie Algebras I

Foundations of Lie Theory.
Lie Transformation Groups

With contributions by **V. V. Gorbatsevich, A. L. Onishchik, E. B. Vinberg**

Translated from the Russian by **A. Kozlowski**

1993. VII, 235 pp. 4 tabs.
(Encyclopaedia of Mathematical Sciences, Vol. 20)
Hardcover DM 144,- ISBN 3-540-18697-2

This book is the first in a sub-series of the EMS devoted to the theory of Lie groups and Lie algebras. Its first part, which is written by Onishchik and Vinberg, is an introduction to this field. The second more advanced part by Gorbatsevich and Onishchik deals with Lie transformation groups and covers the work of the last decades including the most recent research results. The book is written for graduate students and researchers in mathematics and theoretical physics.

Distribution rights for Taiwan: Unifacmanu Trading Co., Taipei, Taiwan

A. L. Onishchik, E. B. Vinberg (Eds.)

Lie Groups and Lie Algebras III

Structure of Lie Groups and Lie Algebras

With contributions by **V. V. Gorbatsevich, A. L. Onishchik, E. B. Vinberg**

Translated from the Russian by **V. Minachin**

1994. Approx. 240 pp.
(Encyclopaedia of Mathematical Sciences, Vol. 41)
Hardcover DM 144,- ISBN 3-540-54683-9

A comprehensive account of the structure and classification of Lie groups and finite-dimensional Lie algebras (including semisimple, solvable, and general type) is contained here. In particular, a modern approach to the description of auto-morphisms and gradings of semisimple Lie algebras is given. A special chapter is devoted to models of the exceptional Lie algebras. The book contains many tables and will serve as a reference. At the same time many results are accompanied by short proofs. This Encyclopaedia volume will be immensely useful to graduate students in differential geometry, algebra and theoretical physics.

Also available:

A. L. Onishchik, E. B. Vinberg

Lie Groups and Algebraic Groups

Translated from the Russian by **D. A. Leites**

1990. XIX, 328 pp. 2 figs.
(Springer Series in Soviet Mathematics)
Hardcover DM 140,- ISBN 3-540-50614-4

Springer

Tm.1843/MNT/V/1