

THE LONDON MATHEMATICAL SOCIETY NEWSLETTER

No. 193

April 1992

FORTHCOMING SOCIETY MEETINGS

Friday 15 May 1992, Burlington House
A.J. Scholl, M.J. Taylor

Friday 19 June 1992, Burlington House
W.B.R. Lickorish, V.G. Turaev

Monday 29 June - Wednesday 1 July 1992
Joint meeting of AMS and LMS, Cambridge

Friday 16 October 1992, Burlington House
Meeting on Functional Analysis

L.J. Bunce, E.M. Christensen, A. Connes, C.M. Edwards

Friday 20 November 1992, Burlington House
Annual General Meeting
J.F.C. Kingman, P. Whittle

WORKSHOP ON DISCONTINUOUS GROUPS

There will be a workshop on Discontinuous Groups at King's College London over a three-day period, 25th to 27th June, before the joint LMS/AMS meeting, with financial support from the London Mathematical Society. A general aim of the conference will be to compare results on Fuchsian, Kleinian and other geometric discrete groups with the more abstract theory of hyperbolic and automatic groups, including arboreal group actions. The provisional list of participants includes: S.R. Bullett, I.M. Chiswell,

C.J. Earle, D.B.A. Epstein, D. Gabai, I. Kra, B. Maskit, C. Maclachlan, G. McShane, A. Papadopoulos, F. Paulin, M. Seppala, D. Singerman and P. Waterman,

Participants will be housed in a local Hall of Residence or Hotel. A registration fee of £15 will be charged for the full conference. Contact Dr W.J. Harvey, Department of Mathematics, King's College, Strand, London WC2R 2LS (e-mail: w.harvey@uk.ac.kcl.cc.oak) if you would like to attend.

VISIT OF PROFESSOR YU.E HOHLOV

Professor Yu.E. Hohlov will be visiting the United Kingdom from Moscow from 28th March to 26th April. He will give seminars on 'Applications of Complex Variable Theory to Hele-Shaw Free Boundary Problems', at Edinburgh University on Monday 20th April (S. Richardson); at Heriot-Watt University on Tues-

day 21st April (A.A. Lacey); Sussex University on Saturday/Sunday 25th/26th April at a workshop on Hele-Shaw Problems (M. Elliott). Further information is available from the people named in brackets. Professor Hohlov's visit has been made possible by a Scheme 2 travel grant from the London Mathematical Society.

ROLPH SCHWARZENBERGER

Professor Rolf Schwarzenberger, who was elected a member of the London Mathematical Society on 17 March 1960, died on 29 February 1992 at the age of 56. He was Treasurer of

the London Mathematical Society from 1979-85, Vice-President from 1988-90, Chairman of the Education Committee since January 1990 and Member of Council since November 1990.

LIST OF MEMBERS OF THE LMS EDITORIAL BOARD - 1992

Authors wishing to submit a paper for publication in the **Bulletin**, the **Journal** or the **Proceedings** should send two copies to the member of the Editorial Board whose mathematical interests are judged to be closest to its subject.

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Professor N.H. Bingham	Department of Mathematics, Royal Holloway & Bedford New College, Egham, Surrey TW20 0EX	Probability
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Professor J.R. Hubbuck	Department of Mathematics, University of Aberdeen, Dunbar Street, Aberdeen AB9 2TY.	Topology
Dr M.W. Liebeck	Department of Mathematics, Imperial College, 180 Queen's Gate, London SW7 2BZ.	Group Theory & Combinatorics
Professor N.G. Lloyd	Department of Mathematics, University College of Wales, Penglais, Aberystwyth, Dyfed SY23 3BZ.	Nonlinear Analysis & Differential Equations
Professor T.J. Lyons	Department of Mathematics, University of Edinburgh, The King's Building, Mayfield Road, Edinburgh EH9 3JZ.	Analysis, Probability & Potential Theory
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Dr A.M. Pitts	Computer Laboratory, New Museum Site, University of Cambridge, Pembroke Street, Cambridge CB2 3QG.	Logic & Theoretical Computer Science
Dr R.J. Plymen	Department of Mathematics, University of Manchester, Manchester M13 9PL.	Functional Analysis
Dr S.J. Pride	Department of Mathematics, University of Glasgow, University Gardens, Glasgow G12 8QW.	Algebra
Dr P.J. Rippon	Faculty of Mathematics, The Open University, Walton Hall, Milton Keynes MK7 6AA.	Potential Theory & Complex Analysis
Professor J.T. Stafford	Department of Mathematics, University of Michigan, Ann Arbor, MI 48109-1003, U.S.A.	Ring Theory
Professor J.B. Twomey	Department of Mathematics, University College, Cork, Ireland.	Complex Analysis & Fourier Analysis
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Professor R.S. Ward	Department of Mathematical Sciences, University of Durham, South Road, Durham DH1 3LE.	Mathematical Physics

D.A. Branan
Publications Secretary

LONDON MATHEMATICAL SOCIETY AND AMERICAN MATHEMATICAL SOCIETY

Joint Meeting

**MONDAY 29 JUNE - WEDNESDAY 1 JULY 1992
UNIVERSITY OF CAMBRIDGE**

Invited Addresses

J.M. BALL (Heriot-Watt)

Energy Minimization and Microstructure

L.C. EVANS (Berkeley)

Harmonic Maps and Hardy Spaces

B.H. GROSS (Harvard)

Langlands Parameters in Representation Theory
and Number Theory

N.J. HITCHIN (Warwick)

Einstein Metrics and Algebraic Geometry

E. WITTEN (Princeton)

Localization and Gauge Theories

Special Sessions

Discrete Group Actions

Probabilistic Combinatorics

Number Theory

Discrete Geometry and Convexity

The Microstructure of Crystals

Operator Algebras

Current Trends in Numerical Analysis of Nonlinear Problems

Groups: Finite and Algebraic

Geometric Topology in Low Dimensions

Classical Analysis

**All participants must preregister in advance of the meeting by 1 May 1992.
For further information and the preregistration form write to Miss S.M. Oakes,
London Mathematical Society, Burlington House, Piccadilly, London W1V 0NL.**

MATHEMATICS AND COMPUTING

In the January Newsletter in this column there was a discussion of some of the better known computer algebra systems. These did not include the IBM sponsored system SCRATCHPAD and its recent successor AXIOM. To redress the balance, Geoff Smith from Bath will now introduce us to these candidates for your attention. So please read on.

It is probably the case that a large number of readers of the LMS Newsletter are not particularly familiar with Computer Algebra systems. Some systems are heavily advertized, and on the other hand, some seem to be rather good. Now that Personal Computers have become sufficiently powerful, it is easy to get them to run algebra systems which will effectively demolish A-level mathematics papers (and more). There are even pocket calculators which will do this, and more remarkable yet, there are even some sixth-formers with this feature.

Since the late 1960's, IBM have had a Computer Algebra project running at their Yorktown Heights research centre in New York State. The name of the project was SCRATCHPAD. In 1991 the rights to the system were assigned to the NAG organization based in Oxford. The project has thereby been transformed into a Computer Algebra system called AXIOM. The Numerical Algorithms Group is a non-profit making organization whose rôle is to bridge the gap between the academic production of research software and the commercial production, distribution and support of software.

An informal group of people, known as 'friends of AXIOM' will continue to support and develop the system. The team at IBM Yorktown are not withdrawing their love, for the moment anyway.

The system is certainly a welcome addition to the Computer Algebra zoo. There are quite a few inmates these days, the more well-known creatures being CAYLEY, DERIVE, GAP, MACSYMA, MATHEMATICA, MAPLE and REDUCE. That list is not exhaustive. These systems often attempt to be good at doing different things. Whilst CAYLEY and GAP are designed with the abstract algebraist in mind, the other systems are often aimed more at the general scientific community, and at casual users.

This is an informal report on how AXIOM differs from its fellow systems. AXIOM is an interactive system with a rich and expressive language. One is not faced with a 'black box', which either will or will not perform a certain

type of calculation. Internally, the system is based on category theoretic notions. Every object belongs to exactly one *domain*, which corresponds to the conventional idea of a data type, so for example the integer 1 belongs to the domain Integer, whereas the "integer modulo 2" 1 belongs to the domain IntegerMod(2). However there is a second level of typing in AXIOM which applies not to the individual objects, but to the domains themselves. These types, known as *categories*, define the algebraic properties of the domains, and are arranged in a hierarchy.

Thus domain integer is of category IntegerNumberSystem which in its turn inherits properties from categories OrderedRing, EuclideanDomain, and UniqueFactorization-Domain to name but three. These in turn define the mathematical properties of the integers, such as the commutative laws, and also determine the algorithms which may be applied to them (e.g. since integers are a EuclideanDomain we can use Euclid's algorithm to compute GCDs). The user is in a position to introduce new domains, new categories and new algorithms.

AXIOM does many of the expected things; it will integrate elementary functions using a variant of the Risch algorithm. It will do linear algebra, but only a little group theory. It also supports Buchberger's method of Gröbner bases, allowing one to solve simultaneous systems of polynomial equations. The lack of substantial group theory in version 1.0 of AXIOM will, I understand and hope, be addressed in a future release. As it stands, the current AXIOM is no threat to CAYLEY or GAP.

An amusing point is that AXIOM supports (infinite) cardinal arithmetic. If you wish to exponentiate, you will have to switch on the Generalized Continuum Hypothesis flag. All systems should have one of those. This writer has searched for the Poincaré Conjecture and Riemann Hypothesis flags without success.

There is a fairly fancy graphics facility, and continuously available windows enabling you to seek help on various matters, or to browse through the features available. The jargon for this facility is *hypertext*. The windows are all active simultaneously (this is so called multi-tasking). A nice touch is that model commands are available in templates. Thus the new user has a fair chance of guessing the correct syntax by editing the template to suit the problem at hand.

Computer Algebra systems are not black magic. Merely specifying an algebraic structure does not, of itself, enable you to actually calculate in the structure - witness the unsolvability of the word problem in finitely presented groups. Nonetheless, you need not always be faced with the task of designing all your own algorithms when working in a structure which is not already supplied by AXIOM. When you construct a new domain, there are sometimes quite a lot of algorithms you can use for free. Similarly a category with lots of ancestors has lots of properties already specified. Equally, you can add an algorithm without adding any new domains or categories.

The initial contents of a particular algebra system will reflect precisely the obsessions of its designers. The system AXIOM admits of indefinite extension in a disciplined and organized way. This strong discipline which is imposed on those who wish to add features to the system is widely canvassed as a solution of problems generated by the so called 'software life-cycle'. There is a tendency for software systems to grow rapidly at first, and then to ossify as the problems of bug-fixing, porting and inadequate documentation overwhelm the managers.

This is not a criticism of any particular person or group of people, but seems inherent in the current methods of software development. It may be that the rigid typing rules of AXIOM will provide a solution, or partial solution, to this problem. Only time will tell, but the authors of AXIOM are to be commended for addressing the issue.

One drawback from the point of view of most British Universities is that the system will only be available for IBM machines for at least the next 18 months. The SUN workstation is currently the workhorse of most British Mathematics and Science departments. At the moment, AXIOM will only run on the IBM RS6000 series. Until recently, this meant just a machine costing £10000+. Now, however, IBM have announced the introduction of smaller, and cheaper, RS machines. It appears that IBM may be preparing to attempt to dislodge SUN machines from their academic perch. It is not my brief to speculate on their chances of success.

For more information about AXIOM, please contact infodesk@nag.co.uk Geoff Smith, School of Mathematical Sciences, University of Bath. gcs@uk.ac.bath.maths.

Derek Holt (dfh@uk.ac.warwick.maths)

UNIVERSITY OF BATH School of Mathematical Sciences

STUDIES IN COMPUTER ALGEBRA FOR INDUSTRY 30 September - 1 October 1992

Computer Algebra is relevant to many fields such as biochemistry, pharmacology, CAD, chemical engineering and aerospace. The Bath team leading the conference is the largest computer algebra research group in the UK with in-depth knowledge of the application of the technology in many industries.

Aim of the Conference

- * to demonstrate the usefulness and cost-effectiveness of computer algebra in industry and to give delegates hands-on experience of the technology and the chance to discuss with experts the relevance of computer algebra to their own industry

Content

- * lectures will be presented by world-famous experts and there will be demonstrations of computer algebra software

Fee

- * £195 (or £160 for IMA members). This covers accommodation and meals, refreshments and course materials.

For details contact: Michelle Heath, Course Administrator,
Centre for Continuing Education, Bath University, Claverton Down, Bath BA2 7AY.

Tel: (0225) 826453 Fax: (0225) 826849

UNIVERSITY OF ST ANDREWS

DEPARTMENT OF MATHEMATICAL AND COMPUTATIONAL SCIENCES

Chair of Pure Mathematics

Applications are invited for a Chair in Pure Mathematics from 1 October 1992 or as soon as possible thereafter. Applicants should have a distinguished record of research and will be expected to take the lead in building up research and teaching in analysis or a related field which will complement the Department's existing research in algebra and applied mathematics.

Salary will be negotiable.

Application forms and further particulars are available from the Head of Personnel Services, The University, College Gate, St Andrews, Fife KY16 9AJ. Tel: 0334 76161 ext 393/522 (out of hours 0334 78856), Fax 0334 75851 to whom completed forms accompanied by a letter of application should be returned to arrive **not later than 16 April 1992**. Please quote Ref No SL84.

The University operates an Equal Opportunities Policy.

Lectureship in Pure Mathematics

Applications are invited for a Lectureship in Pure Mathematics, tenable from 1 September 1992.

The post will be based in the Department of Mathematics in the Faculty of Mathematical Studies, and follows the recent appointment of Dr Martin Dunwoody to a Chair of Pure Mathematics in that Department.

Salary will be assessed on lecturer Grade A (£12860-£17827) or B (£18572- £23793).

Further particulars can be obtained from:

The Personnel Department,
University of Southampton,
Highfield SO9 5NH,

to whom applications (7 copies from UK applicants), including the names and addresses of three referees, should be sent to arrive not later than 27 April 1992.

"Working for Equal Opportunities"

Please quote reference L/201/LMSN.



**University
of Southampton**

CONTINUUM MODELS FOR THE MICROSTRUCTURE OF CRYSTALS

This international conference, under the auspices of the International Centre for Mathematical Sciences, will be held from 8th to 13th June 1992 at Heriot-Watt University, Edinburgh. It will concern the continuum modelling of microstructures and phase transitions in crystals from the points of view of continuum mechanics, the calculus of variations, experiment and computation. The speakers are leading mathematicians, materials scientists, and physicists working on problems of common interest, who will present new developments in the field.

Speakers are expected to include: K. Bhattacharya (Courant Institute), M. Chipot (Metz), N.B. Firoozye (Heriot-Watt/Minnesota), I. Fonseca (Carnegie-Mellon), R.D. James (Min-

nesota), A. Khachaturyan (Rutgers), D. Kinderlehrer (Carnegie-Mellon), R.V. Kohn (Courant Institute), M. Luskin (Minnesota), S. Müller (Bonn), G. Parry (Bath), A.L. Roitburd (Maryland), P. Rybka (Warszawa), D. Schryvers (Antwerp), J. Sethna (Cornell), V. Sverak (Heriot-Watt/Prague) and P.J. Swart (Cornell).

Limited financial support is available for U.K. participants. Preference may be given to younger mathematicians. Some funds may also be available for participants from developing countries. For further information and application forms, contact: Dr Nick Firoozye, Department of Mathematics, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS. Tel. 31-451 3253, fax 31-451-3249, e-mail: icms@cara.ma.hw.ac.uk.

IRISH MATHEMATICAL SOCIETY MEETING

The Fifth September Meeting of the Irish Mathematical Society will take place in Waterford Regional Technical College on Thursday and Friday 3rd and 4th September 1992. Speakers will include D. Armitage (Queens University, Belfast), R. Brown (University College of North Wales, Bangor), E. de Leaster (Waterford Regional Technical College), P. Fitzpatrick (University College, Cork), D. Ince

(Open University), J. Lewis (Dublin Institute of Advanced Studies), J. McDermott (University College, Galway) and M. Stynes (University College, Cork).

Further details from Brendan McCann or Michael Brennan, Department of Physical and Quantitative Science, Waterford Regional Technical College, Cork Road, Waterford. Telephone 051-75934 ext 1504, fax 051-78292.

FINITE GEOMETRY CONFERENCE

A Conference on Finite Geometry will be held from 11th to 14th April 1992 at Lehigh University, Bethlehem, Pennsylvania. The first two days of the Conference will be part of the regional meeting of the American Mathematical Society and the final two days will be dealt

with Oberwolfach-style at the time of the Conference. For further information contact the Project Director, E.F. Assmus, Jr, Department of Mathematics, Building 14, Lehigh University, Bethlehem, PA 18015, U.S.A. or via e-mail at efa0@ns.cc.lehigh.edu.

THE 1992 COLLINGWOOD LECTURE

The Department of Mathematical Sciences of the University of Durham holds an annual lecture on the History and Philosophy of Mathematics, in memory of Sir Edward Collingwood, FRS. The 1992 lecture will be given by Professor R. Penrose FRS of Oxford University, who will

speak about "Magic Dodecahedra and the Mystery of Quantum Entanglement". The lecture will take place at 3.15 pm on Friday 24th April in the Scarborough Lecture Theatre, Science Laboratories, University of Durham.

GROUPS IN GALWAY 1992

A conference on Group Theory will be held at University College, Galway, Ireland on 15th and 16th May 1992. The speakers will include B. Hartley (Manchester, England) and H. Smith

(Bucknell, Pennsylvania & Cardiff, Wales). Further information may be obtained from R.S. Dark, University College, Galway, Ireland, e-mail: matdark@bodkin.ucg.ie.

NATIONAL UNIVERSITY OF SINGAPORE

DEPARTMENT OF MATHEMATICS



Applications are invited for teaching appointments at the Lecturer or Senior Lecturer level from candidates who are able to teach in one or more of the following areas:

Pure Mathematics
Applied Mathematics
Operations Research
Statistics

Candidates should possess a PhD degree in Mathematics and have a strong commitment to teaching and research.

Gross annual emoluments range as follows:

Lecturer	S\$50,390 - 64,200
Senior Lecturer	S\$58,680 - 100,310
(STG£1.00 = S\$2.90 approximately)	

The commencing salary will depend on the candidate's qualifications, experience and the level of appointment offered.

Leave and medical benefits will be provided. Depending on the type of contract offered, other benefits may include: provident fund benefits or an end-of-contract gratuity, a settling-in-allowance of S\$1,000 or S\$2,000, subsidised housing at nominal rentals ranging from S\$100 to S\$216 p.m., education allowance for up to three children subject to a maximum of S\$16,425 per annum per child, passage assistance and baggage allowance for the transportation of personal effects to Singapore. Staff members may undertake consultation work, subject to the approval of the University, and retain consultation fees up to a maximum of 60% of their gross annual emoluments in a calendar year.

The Department of Mathematics is a department in the Faculty of Science. There are eight faculties in the National University of Singapore with a current student enrolment of some 15,000. All departments are well-equipped with a wide range of facilities for teaching and research.

All academic staff have access to the following computer and telecommunication resources: an individual microcomputer (an IBM AT-compatible or Apple Macintosh); an IBM mainframe computer with 16 MIPS of computing power; an NEC SX supercomputer with 650 MFLOPS of computing power; departmental laser printers; a wide spectrum of mainframe and microcomputer software; voice-mail. A campus-wide network, which is based on the high speed optical fibre based FDDI technology, links up all the academic staff and student microcomputers, UNIX workstations and provides access to the mainframe computer, the supercomputer, UNIX hosts, the on-line library catalogue, Internet and BITNET.

Application forms and further information on terms and conditions of service may be obtained from:

The Director
Personnel Department
National University of Singapore
10 Kent Ridge Crescent
Singapore 0511

NUS Overseas Office
Singapore High Commission
(Students Department)
16 Kinnerton Street
London SW1X 8ES.U.K.
Tel:(071) 235-4562

Enquiries may also be sent through BITNET to: PERPL@NUS3090,
or through Telefax: (65) 7783948

GUEST RESEARCH FELLOWS

The Council of the Royal Society invites applications for the support of Guest Research Fellows. The object of this scheme, established in 1980, is to assist outstanding leaders in scientific research in the United Kingdom to invite as guests scientists of proven ability, normally resident overseas, to come and work with them for periods of between four months and one year. The aim is to provide for research needs which can best be met by such international collaboration, and proposed guests should be key workers, normally already holding established posts, who would bring unique expertise to the hosts in the United Kingdom. Emphasis in selection will be on the abilities and field of research of the applicant working in

the United Kingdom and on those special contributions to the applicant's research which would be provided by the visitor and are not available in the United Kingdom.

Applicants must be working in departments of science (including agriculture, medicine, mathematics, engineering and technology) in universities or research institutions in the United Kingdom. Direct applications from intending guests from overseas are not acceptable.

Applications should be made on forms to be obtained from the Executive Secretary (LUM), The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG, and returned by 30 April 1992.

SUSSEX FOURIER ANALYSIS WORKSHOP

Further to the successful workshop held in 1989, it is planned to hold a second Fourier Analysis Workshop at Sussex University from 10th to 14th August 1992. It will be run on informal lines, with a limited number of 1 hour talks and plenty of time for discussion of topics such as Oscillatory Integrals in Fourier Analysis, Singular Operators over Lower Dimensional Sets,

Sharp Sobolev Inequalities and Methods from Fourier Analysis in Local Smoothing of P.D.E's. This workshop is partially supported by the London Mathematical Society and is open to all members. For further details, contact Dr A. Carbery, Mathematics Division, University of Sussex, Brighton BN1 9QH.

ONE-DAY CONFERENCE IN STATISTICAL MECHANICS - STATMECH-8

This one-day conference will be held on 28th May 1992 at King's College, London. It will be similar in format to previous meetings of the series and will consist of short contributed talks, of about 20 minutes duration together with two invited lectures, which this year will be given by V. Privman (Oxford and Clarkson) and D. Stauff-

fer (Cologne). There is no charge for this conference. The deadline for those wishing to contribute a talk is 29th April (title only required). For further details contact: D.A. Lavis, Department of Mathematics, King's College, Strand, London WC2R 2LS. Telephone 071-873 2240/2217; email: maths@uk.ac.kcl.cc.oak.

ONE-DAY FUNCTION THEORY MEETING

The annual one-day meeting in Function Theory will be held at the Department of Mathematics, University College, London WC1E 6BT on Monday 28th September 1992. The meeting receives the financial support of the London Mathematical Society and is open to all interested persons. Lectures are usually ar-

ranged from 11 am till around 5 pm and details will be sent out in a second notice in May. Those interested in receiving such a notice should write to Professor J.M. Anderson, Department of Mathematics, University College, London WC1E 6BT.

ALGEBRAIC GEOMETRY AND CODING THEORY

Professors M.A. Tsfasman and S.G. Vladuts from the Institute for Problems of Information Transmission in Moscow are visiting the University of Sussex from April to June, sponsored by the S.E.R.C. A one day conference with four 45-minute talks on the above theme will be held at the University of Sussex on Wednesday 20 May from 11 am to 4 pm in the Mathematical and Physical Sciences Building,

Room 1A3. The speakers include M.A. Tsfasman 'Asymptotic zeta functions of global fields'; S.G. Vladuts 'Problems in algebraic geometry coming from codes, packings and the like'; J.A. Thas 'MDS codes and arcs in projective spaces'. For further details contact Dr J.W.P. Hirschfeld at Sussex; telephone 0273 678080, e-mail mmfd4@uk.ac.susx.central.

Solitons, Nonlinear Evolution Equations and Inverse Scattering

M. J. ABLOWITZ and P. A. CLARKSON

This book brings together several aspects of soliton theory currently only available in research papers. Emphasis is given to multi-dimensional problems.

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London Mathematical Society Lecture Notes 149

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S. M. VOVSİ

This book provides a detailed exposition of several central topics in the field. Much of the included material has never been available in book form before. It is intended for a broad audience working in abstract algebra and its many applications.

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London Mathematical Society Lecture Notes 163

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London Mathematical Society Lecture Notes 174
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Encyclopedia of Mathematics and its Applications 47

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ARMEN H. ZEMANIAN

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Cambridge Tracts in Mathematics 101

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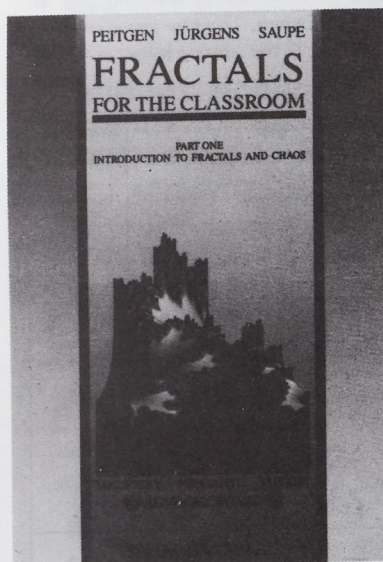
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H.-O. Peitgen, H. Jürgens, D. Saupe

FRACTALS FOR THE CLASSROOM

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Introduction to Fractals and Chaos

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Part 2

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COMPARISONS OF 3/4 DEGREE PROPOSAL WITH THE FRENCH SYSTEM

Comparisons have been made between the 3/4 degree schemes currently being discussed and the French DEUG/Licence/Maitrise system. At the meeting of Professors of Applied Mathematics at University College, London, last autumn, I was asked if figures were available on the takeup of the 4th year option in France. Such statistics are in fact published regularly in the *Gazette des Mathématiciens*, the analogue of this Newsletter for the Société Mathématique de France. The latest full figures I have seen were in the January 1991 issue and relate to the year 1988/89. Care needs to be taken in reading such statistics as it is important to remember that the figures for the DEUG include many students of Physics, Computer Science etc, who did not intend to 'go on' to do Mathematics.

As an example, for 1988/89 at the University of Lille, 544 students passed the 1st year of the DEUG, 469 passed the 2nd year of the DEUG, 114 obtained a Licence, and there seem to have been no candidates for a Maitrise. The following year 50 students obtained a Maitrise. I cannot know from the way in which the figures are displayed whether there was a possibility of students taking a Maitrise at Lille 1 in 88/89. For the purposes of the UK 3/4 degree proposal, the interesting figure is the 50 students who obtained it in 1989/90. Lille has a catchment area that traditionally overlaps with that of Amiens and Valenciennes neither of which seem to have had a Maitrise operating in 1989/90 so perhaps the 50 students included students from

these other centres. (The person who collected the statistics did not obtain 100% replies to his questions.)

The figures overall seem consistent with about one quarter to one third of students continuing successfully to Maitrise. Figures for Strasbourg from 1984/85 are given in the report of the Comité National d'Evaluation (C.N.E.) (1986-1988). These indicate 61 students registered for a Licence, 27 passed, 24 registered for a Maitrise 11 passed. The figures for 1989/90 were 130 (82) and 66 (34) [in each case the figures are "registered (passed)".]

Beware of false facile interpretations of the figures as the examination system within the Universities is very different to the UK model as is the funding system used. I would welcome comments from any one who knows other European systems well, or the French system better than I do, as I feel that all too often superficial comparisons are blandly made without a detailed analysis of the different social and educational structure of the other country.

A second valuable source of information on French university mathematics departments is the reports of the C.N.E. which operates a bit like Academic Audit. The evaluation reports are published regularly in the interests of access to relevant information on public institutions and make very interesting reading.

T. Porter

mas013@uk.ac.bangor.vaxa

VISIT OF PROFESSOR F.J. DYSON

Professor F.J. Dyson, FRS, will give the Fifth Schrödinger Lecture on "Quantum Past - The Limitations of Quantum Theory" on Thursday 7th May at 5.30 pm in the Great Hall of Imperial College, London SW7. A seat can be guaranteed by holding a ticket, obtainable from

Mr John Vandridge-Ames of the Imperial College Registry. There is a Pure Mathematics Seminar on 8th May at 2.30 pm at Imperial College by Professor Dyson - title to be announced.

VISIT OF DR A. PAZHITNOV

Dr A. Pazhitnov (Moscow) will be visiting the United Kingdom under the auspices of the Visitor Scheme 2 of the London Mathematical Society. He will deliver three lectures on "Surgery on the Novikov Complex" at the following places and times: Edinburgh University, Friday 1st May, 2.30 pm, Room 7, Appleton Tower; Durham University, Wednesday 6th May, 4.15

pm, Room CM221, Department of Mathematical Sciences; Cambridge University, Thursday 7th May, 2.30 pm, Room 6, Mill Lane Lecture Rooms. For further particulars please contact Professor E. Rees or Dr A. Ranicki at the Mathematics Department of Edinburgh University.



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Finite Soluble Groups

1992. XIV, 891 pages. 17 x 24 cm. Cloth DM 268,- ISBN 3-11-012892-6
(de Gruyter Expositions in Mathematics, Vol. 4)

This book presents an overall picture of the theory of finite soluble groups as it has developed over the past thirty years. Emphasis is on those parts of the subject where a coherent and unified body of knowledge has emerged: the theory of Schunck classes and formations with their associated projectors and normalizers; and the dual theory of Fitting classes with their injectors and radicals. All this material can be regarded as one vast and splendid generalization of the subgroups of Sylow and Hall: to have engendered an expansion of knowledge of such cosmic proportions, Sylow's theorem might well be compared to the Big Bang.

The book is essentially self-contained and includes all the basic and prerequisite results from group theory and representation theory to make it accessible to a student who is familiar with the basic methods of modern algebra. As a standard reference the book should provide a stimulus to further research in the subject area that has shown itself capable of a vigorous new life.

Contents:

Prerequisites - general group theory · Prerequisites - representation theory · Introduction to soluble groups · Classes of groups and closure operations · Projectors and Schunck classes · The theory of formations · Normalizers · Further theory of Schunck classes · Further theory of formations · Injectors and Fitting sets · Fitting classes - examples and properties related to injectors · Fitting classes - the Lockett section · Fitting classes - their behaviour as classes of groups · Appendix α : A theorem of Oates and Powell · Appendix β : Frattini extensions.

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Anvarbek M. Meirmanov

The Stefan Problem

Translated from the Russian by Marek Niezgódka and Anna Crowley

1992. IX, 245 pages. 17 x 24 cm. Cloth DM 148,- ISBN 3-11-011479-8

(de Gruyter Expositions in Mathematics, Vol. 3)

The Stefan problem is one of the most classical free boundary problems of parabolic type. It arises from modelling phase-change phenomena, such as phase transitions between, for instance, liquid and solid states of a material. Since the appearance of Rubinstein's important monograph in 1967 this book provides the first systematic analysis of Stefan-type problems. The existence of classical solutions for the multidimensional Stefan problem was a long-standing problem. The author's approach to the solution of this problem forms the central part of the book. Together with a complete constructive proof of the classical solvability (local in time), examples of critical developments showing the lack of global-in-time solutions in the general setting are given. A careful analysis of the intrinsic structure of the free boundaries that can have the form of mushy zones is provided. For one-dimensional Stefan problems, qualitative properties of global classical solutions are studied, including an analysis of their asymptotic behaviour and periodicity. The role of compatibility conditions is discussed. This book is addressed to advanced students and research mathematicians, in particular applied mathematicians and engineers.

Contents:

Preliminaries · Classical solution of the multidimensional Stefan problem · Existence of the classical solution to the multidimensional Stefan problem on an arbitrary time interval · Lagrange variables in the multidimensional one-phase Stefan problem · Classical solution of the one-dimensional Stefan problem for the homogeneous heat equation · Structure of the generalized solution to the one-phase Stefan problem. Existence of a mushy region · Time-periodic solutions of the one-dimensional Stefan problem · Approximate approaches to the two-phase Stefan problem · Appendix: *I. G. Götz, A. M. Meirmanov*: Modelling of binary alloy crystallization.

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NANYANG TECHNOLOGICAL UNIVERSITY NATIONAL INSTITUTE OF EDUCATION

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Applications are invited for Faculty appointments in the Division of Mathematics of the School of Science from candidates who must possess a relevant PhD degree. Preference will be given to those who are able to teach in more than one of the areas listed and with proven ability in research. Candidates for Mathematics Education positions should also have a professional teaching qualification and at least 2 years of relevant qualified teaching experience.

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Candidates wishing to be considered should write or fax to:

**Director of Personnel
NANYANG TECHNOLOGICAL UNIVERSITY
Nanyang Avenue
Singapore 2263
Fax: 791 9340**

giving their Curriculum Vitae and the names and addresses of Three Referees.

THE MATHEMATICAL HERITAGE OF SIR WILLIAM ROWAN HAMILTON

October 16th, 1993 marks the sesquicentennial of the discovery of the quaternions (with its well-known story of the inscription on the bridge) by Hamilton. This event marks the final break between algebra and arithmetic but this was only one of Hamilton's many achievements. His fundamental contributions to dynamics and combinatorics are equally well known. To celebrate this occasion an international conference featuring algebra, combinatorics and dynamical systems has been organised by the Royal Irish Academy in Trinity College, Dublin from Tuesday 17th to Friday 20th August, 1993.

The following have provisionally accepted invitations to speak: N.L. Biggs (L.S.E. London), J.K. Moser (ETH, Zurich), P.M. Neumann (Queen's College, Oxford), A.C. Newell (Tucson, Arizona), C. Procesi (La Sapienza, Roma) and

G-C. Rota (M.I.T., Cambridge). In addition to the plenary sessions, some participants shall have the opportunity to present short research papers during the parallel sessions on algebra, combinatorics and dynamical systems.

Those interested in being included on the conference mailing list should write to: Hamilton Conference, Department of Mathematics, Dublin Institute of Technology, Kevin Street, Dublin 8, Ireland. To obtain information on the conference by e-mail, send the message: "send hamilton-conf.info" to info-server@maths.tcd.ie.

Further information may be obtained from any of the organisers: B. Goldsmith, Dublin Institute of Technology (Principal Organiser), T.J. Laffey, University College, Dublin or D.J. Simms, Trinity College, Dublin.

NUMERICAL ANALYSIS - SHELL MODELS

A Summer School on Numerical Analysis - Shell Models will be held from 15th to 26th June 1992 at the Centre d'Etudes du Breau, 78 Yvelynes, France. The course will be given by

W.B. Kratzig, M. Bernadou, Y. Basar and E. Riks. For further information write to Madame Hue, Ecoles d'Eté, 1 avenue du Général de Gaulle, F-92150 Clamart, France.

THE MATHEMATICS OF ANOREXIA AND ITS CURE

Sir Christopher Zeeman, Gresham Professor of Geometry will give a lecture on The Mathematics of Anorexia and its Cure at 5 pm on Tuesday 28th April 1992 in The Main Hall, City of London School for Girls, Barbican, London EC2Y 8BB.

Anorexia is a behavioural disorder suffered mainly by adolescent girls and young women, in whom dieting has become obsessive fasting. The lecture will describe a mathematical model

of what may have gone wrong with the underlying brain dynamics, causing abnormal moods and perceptions. The model gives insight into a successful method of cure using trance therapy. The advantage of using mathematical language is that it is psychologically neutral, and permits a coherent synthesis of a large number of observations that would otherwise appear disconnected; in particular it enables the trance state to be placed in relation to other behavioural modes.

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PROGRESS IN ALGEBRAIC GEOMETRY AND RING THEORY

The meeting "Progress in Algebraic Geometry and Ring Theory" will be organized from 11th to 14th May 1992 in Antwerp, Belgium and will be dedicated to general themes in algebraic geometry and ring theory. The meeting is in honour of M. Artin. The tentative list of speakers are: M. Artin, M. Auslander, A. Bak, F. Cossec, J. Denef, I. Dolgachev, E. Friedlander, R. Hartshorne, L. Illusie, M. Karoubi, J. Milne, J. Murre, C. Procesi, Y. Razmyslow, W. Schelter, P. Smith, T. Stafford, J. Tate, M. van den Bergh and E. Vinberg. Apart

from plenary talks there will also be short communications. If you are interested in receiving further information, attending the meeting or giving a talk, contact one of the following organizers as soon as possible: F. Van Oystaeyen, University of Antwerp, U.I.A., Department of Mathematics, Universiteitsplein 1, B-2610 Wilrijk, Belgium or A. Verschoren, University of Antwerp, R.U.C.A., Department of Mathematics, Groenenborgerlaan 171, B-2020 Antwerpen, Belgium.

SIR NORMAN LOCKYER FELLOWSHIP

The Royal Astronomical Society invites applications for the Sir Norman Lockyer Fellowship for astronomical research at a United Kingdom institute of higher education. The Fellowship is tenable for up to 3 years and will begin on 1st October 1992. The appointee, normally aged 30 years or under on the 1st October of the year of appointment, must hold a doctorate from a recognized institute of higher education. The award is based on the UK university, non-clinical, academic and related

research staff scale and will be related to age on appointment. Additional funds will be made available for other expenses associated with the research.

Further particulars are available on request from the Executive Secretary, (Sir Norman Lockyer Fellowship), Royal Astronomical Society, Burlington House, Piccadilly, London W1V 0NL. The closing date for applications is 30th April 1992 and selected candidates will be invited for interview in May 1992.

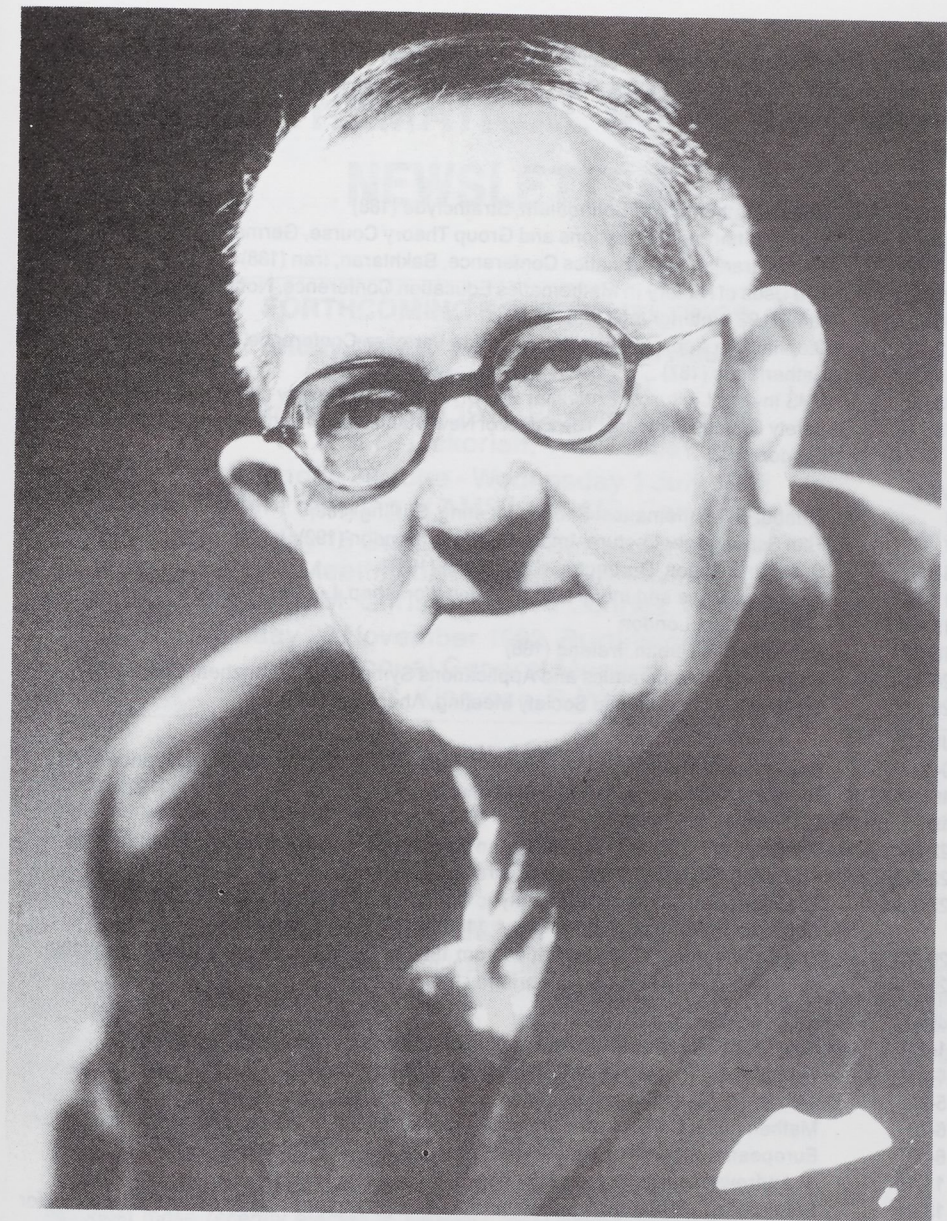
MERTON COLLEGE

Fixed Term Tutorial Fellowship in Pure Mathematics

The College proposes to elect a tutorial Fellow in Pure Mathematics. This will be held for a fixed term of five years commencing on 1 October 1992 or as soon as possible thereafter. The post, which is open to men and women, is associated with a five year Temporary University Lecturership (CUF).

Further particulars and an application form may be obtained from the Warden's Secretary, Merton College, Oxford OX1 4JD (telephone 0865-276352). The closing date for applications is **Friday 8 May 1992**.

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Harold Davenport (1907-1969) was born in Accrington and studied mathematics first at Manchester University then Trinity, Cambridge, becoming a Fellow there in 1932. After the war he became Astor Professor at University College, London and in 1958 Rouse Ball Professor at Cambridge. A number theorist, he worked on the geometry of numbers, Diophantine approximation, and the analytical theory of numbers. He was elected to Fellowship of the Royal Society in 1940 and was awarded their Sylvester medal in 1967. The London Mathematical Society awarded him the Senior Berwick Prize in 1954. He was the Society's 47th President from 1957-1959.

DIARY

The diary lists Society meetings and other events publicised in previous issues of the Newsletter. For further information, refer to the figure in brackets, which is a cross reference to the LMS Newsletter Number.

1992

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- 6-10 British Mathematical Colloquium, Strathclyde (188)
- 6-10 Partial Differential Equations and Group Theory Course, Germany (192)
- 7-10 Annual Iranian Mathematics Conference, Bakhtaran, Iran (188)
- 10-12 The Uses of History in Mathematics Education Conference, Nottingham (186)
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The Newsletter is published monthly except in August. Items and advertisements for inclusion in the Newsletter should be sent to the Editor, Susan Oakes, London Mathematical Society, Burlington House, Piccadilly, London W1V 0NL, to arrive before the first day of the month prior to publication. Telephone 071- 437 5377, Fax 071-439 4629, E-mail lms@uk.ac.kcl.cc.oak.
