

THE LONDON MATHEMATICAL SOCIETY NEWSLETTER

No. 171

April 1990

FORTHCOMING SOCIETY MEETINGS

Friday, Saturday, 18-19 May 1990, Sheffield

Two-day meeting on Functional Analysis

Friday 15 June 1990, Burlington House

L.E. Fraenkel, H.K. Moffatt

Friday 19 October 1990, Burlington House

Friday 16 November 1990, Burlington House

CONGRATULATIONS

At a meeting of the Council of the Royal Society held on 14th December 1989, Professor E.C. Zeeman, FRS, Principal of Hertford College, Oxford, and immediate past President of the Lon-

don Mathematical Society, was appointed as a Vice-President of the Royal Society for the forthcoming year.

ONE-DAY COMBINATORICS COLLOQUIUM

There will be a One-Day Combinatorics Colloquium at Reading University, Department of Mathematics, on Wednesday 25th April 1990 from 10.15 a.m. to 5.15 p.m.

Speakers will include: Mr A. Sanchez Arroyo

(Oxford); Professor N.L. Biggs (L.S.E.), Dr G. Brightwell (L.S.E.), Dr A.R. Camina (U.E.A.), Dr Bill Jackson (Goldsmiths'), Professor R. Lewin (Haifa, visiting Reading), Dr H.D. MacPherson (Queen Mary College), Dr D.J.A. Welsh (Oxford).

ALGEBRAIC METHODS IN COMPUTING SCIENCE

A Summer School on *Algebraic methods in computing science* will be held during Sunday 16th September - Saturday 22nd September 1990, at the University College of Swansea, Swansea, Wales. The Summer School is sponsored by SERC under the Logic for Information Technology Initiative.

General algebraic concepts and techniques have been vigorously developed and applied in computing for more than 25 years. The objectives of the Summer School will be (i) to educate research students, and university and industrial scientists, in mathematical theories to an advanced level; and (ii) to introduce many current theoretical and applied research problems involving algebraic methods. At present the basic courses will be as follows: J.V. Tucker, *Designing algebras*; J.A. Goguen, *Algebraic methods and theorem proving*; H. Simmons, *Equations and horn clauses: logic and model theory*; J. Meseguer, *Initial model semantics*; J.W. Klop, *Term rewriting*; J. Baeten, *Process algebra*.

In addition, there will be tutorial sessions, survey lectures and liberal consultation periods on various topics by several experts, including G. Smolka, V. Stavridou, H.D. Ehrich, D. Rydeheard, T. Nipkow, K. Meinke, B.C. Thompson and N.A. Harman. Further experts will be invited.

The full cost of the meeting, including board and lecture notes, is as follows: *Academic Participants*: £250; *Industrial Participants*: £450. A generous number of British SERC Research Students may be fully funded by grants under SERC Logic for IT Initiative. In keeping with the character of a Summer School the number of places will be limited and early registration is strongly recommended.

For further information and a registration form contact: Dr B.C. Thompson, Computer Science Division, Department of Mathematics and Computer Science, University College of Swansea, Swansea SA2 8PP, United Kingdom (email: csben@uk.ac.swan.pyr).

SYMBOLISM

An exhibition of sculptures by John Robinson which was initially shown at the Pop Maths Roadshow at Leeds in September 1989, will be shown at the Main Arts Building, University of Wales, Ban-

gor, from 24th April to 7th May and at Liverpool Anglican Cathedral, from 9th to 20th May. The latter event will be associated with the Pop Maths Roadshow at the University of Liverpool.

NONLINEARITY

A residential meeting on the general theme of nonlinear phenomena will be held in the Department of Physics, Bristol University, from 9th to 10th April 1990. This meeting will cover aspects of nonlinearity varying from the study of AIDS to the Yang-Mills equations and aims to bring together workers in many different fields united by a common interest in nonlinear behaviour. It follows a series of successful scientific meetings prompted by the editorial board of the journal **Nonlinearity**.

Accommodation is provided for the night of 9th April in Clifton Hill House, Bristol at a cost of £25 for dinner, bed and breakfast. The meeting is also

open to anyone who just wants to come for the individual days. The meeting starts at 2.15 p.m. on the 9th April and at 9.30 a.m. on the 10th April and is in the Mott Theatre of the Department of Physics.

Speakers are: S. Donaldson (Oxford), L. Fadeev (Leningrad), J. Robbins (Bristol), T. Palmer (E.C.M.W.F.), R. May (Oxford), A. Cliffe (AEA Harwell), P. Clarkson (Exeter), A. Fowler (Oxford) and C. Budd (Bristol).

To attend, write to Alison Solman, Mathematical Institute, University of Warwick, Coventry CV4 7AL. E-mail ajs@uk.ac.warwick.math.

DYNAMICS AND COMPLEXITY

An international study conference will be held from 1st to 8th July 1990 on Dynamics and Complexity in the Interactions of Man and Nature at Novum Research Park, Huddinge, Sweden. The material for the study conference will be gathered from the fields of mathematics, technology, ecology, physics, systems analysis and economics. Speakers are: A.E. Andersson, C.

Birnes, K.E. Eriksson, K.G. Måler, J.M. McGlade, D. Rand and D. Saari.

For further information write to Mrs G. Fornell, Institute for Physical Resource Theory, Chalmers University of Technology, S-412 96 Göteborg, Sweden. Telephone 46-31723147. Fax 46-31723150.

HISTORY IN MATHEMATICS EDUCATION

The Challenge of the National Curriculum is to find ways of developing in pupils delight and wonder at the excitement of mathematics, as well as learning its usefulness on various levels. One means of doing this is through its history. In recent years other European countries have taken a lead over the UK in developing historical perspectives within the mathematics curriculum.

The British Society for the History of Mathematics has organised a major international conference on this topic, to be held at the University of Leicester from 7th - 9th April 1990, whose purpose is to increase awareness in Britain of the important work being done internationally in teaching mathematics through the use of historical

texts and problems. Mathematics teachers with experience of using history are coming from Denmark, France, Germany, Holland, Portugal, Greece and Israel, to share with British teachers their experiences of classroom activities and initiatives in various teaching contexts. There will be talks, workshops, and discussions of the scope offered by the National Curriculum and what we can learn from the European experience.

The conference has been made possible thanks to sponsorship from the London Mathematical Society and from Apple Computer U.K. Ltd. Further information may be obtained from Dr Steve Russ, HIMED 90, Department of Computer Science, University of Warwick, Coventry CV4 7AL (0203-523681).

NUMERICAL ANALYSIS SYMPOSIUM

The third International Symposium of Numerical Analysis will be held from 22nd to 24th May 1990 in Madrid, Spain. It is jointly organised by The Polytechnic University, Madrid and The University of Prague. The main topic of this meeting is scientific and engineering computation.

Invited speakers include Professors Samarski, Tihomirov and Mihailov (USSR); Douglas (USA);

Ortiz (Great Britain); Ansonge, Niethammer and Werner (Germany); Ciarlet, Pironneau and Raviart (France); Axelsson (The Netherlands), and others.

The proceedings of the conference will be published. For further information or submission of a paper write to: I.S.N.A.3, Professor C. Vega, Universidad Politécnica de Madrid, Ramiro de Maeztu, s/n, 28040 Madrid, Spain.

LMS MAY MEETING
FRIDAY-SATURDAY 18-19 MAY 1990
UNIVERSITY OF SHEFFIELD
FUNCTIONAL ANALYSIS

Friday 18 May

- 14.30** Opening session
- 14.40** Professor G. Pisier (Paris 6 and Texas A & M)
Factorization of operator-valued analytic functions and complex interpolation
- 15.40** Tea
- 16.30** Professor V. Milman (Tel-Aviv) *From functional analysis and geometry to geometric analysis*

Saturday 19 May

- 9.00** Professor G.K. Pedersen (Copenhagen) *Real rank of C^* -algebras as a non-commutative aspect of dimension.*
- 10.00** Coffee
- 10.30** Dr A.M. Sinclair (Edinburgh) *Operator spaces and completely bounded operators*
- 11.30** Coffee
- 12.30** Professor C. Foias (Indiana) *Inertial sets for dissipative differential equations*

Lectures will be held in Lecture Room A, Hicks Building, Hounsfield Road, University of Sheffield.

A dinner will be held in the Senior Common Room Club at the University of Sheffield on the evening of Friday 18 May at 7.30 p.m., preceded by a sherry reception from 7 p.m. Those wishing to attend should inform Dr P.G. Dixon, Department of Pure Mathematics, University of Sheffield, Sheffield S3 7RH, enclosing a cheque for £17 per person payable to the University of Sheffield, to arrive by 1 May. A vegetarian option is available, if requested when booking.

A list of nearby hotels may be obtained from Dr Dixon. Participants will be expected to contact the hotels directly for reservations.

Enquiries may be addressed to the Department of Pure Mathematics, University of Sheffield.

NATIONAL CURRICULUM ASSESSMENT

The Education Committee has asked that we alert members of the Society to the very rapid changes taking place in the mathematics curriculum of schools in England and Wales. For clarity we have listed the crucial events by reference to the date at which a typical 18-year old might enter a university or polytechnic

- 1989 First entrants with **AS-level** as alternative to A-level in some subjects.
- 1990 First entrants with AS- or A-level who all took **GCSE** (but not necessarily with compulsory course work component) at age 16+ in 1988
- 1993 First entrants with AS- or A-level who all took **GCSE (with compulsory coursework component)** at age 16+ in 1991
- 1996 First entrants with "**new**" AS- or A-level who all took **national curriculum assessment** at age 14+ in 1992 and "**new**" **GCSE graded by 10 national curriculum levels** instead of former grades A-G in 1994
- 2001 First entrants who in addition all took national curriculum assessment at age 11+ in 1994
- 2002 First entrants who in addition all took national curriculum assessment at age 7+ in 1991

There are some doubts at the practicality of the whole scheme and its intended rate of implementation. A primary teacher with a class of 30 assessed

over $14 + 17 + 5 = 36$ attainment targets in mathematics, science and English will need to make 1080 separate assessments; a secondary teacher with 4 classes of 25 assessed over 14 mathematics attainment targets will need to make 1400 separate assessments (in each case choosing between several possible levels). In addition provision will have to be made for local moderation groups in cases of differing standards between schools or inconsistency between teacher assessment and nationally produced standard assessment tasks. There are doubts whether the exercise of reporting GCSE grades in terms of the 10 levels of the national curriculum is feasible given the lack of success in arriving at criterion referenced grades in the past. There are doubts whether the outcome of this exercise will be early enough to allow time for the development of new AS- and A-level courses to start by 1994. And there are fears that these changes will themselves be a factor in encouraging the current flight of mathematics teachers from the profession. Clearly these developments will have a very substantial effect on university and polytechnic mathematics departments over the next 10 years. The Education Committee intends to make factual information available to members through the Newsletter (space restrictions and reader reaction permitting) beginning with notes on the effects of GCSE coursework on pupils' mathematical capability and the likely shape of the new A-level courses.

S. Burns

R.L.E. Schwarzenberger

THE ROYAL INSTITUTION OF GREAT BRITAIN Mathematics Masterclasses

The educational programme of the Royal Institution, is soon to be significantly enlarged as a result of a grant of £750,000 from The Clothworkers' Foundation. The money is to be used to extend to other geographical regions of Britain the highly successful Mathematics Masterclasses for Young People that were started in London in 1981 and to underpin the existing classes within the Royal Institution.

Hitherto funding of Mathematics Masterclasses at the Royal Institution and other centres has been through industrial sponsors, e.g. Shell U.K., B.P. International, G.E.C., International Computers, Anglesey Aluminium; educational trusts and organisations such as the Leverhulme Trust, the Nuffield Foundation, the Royal Society, many Colleges of the University of Cambridge; a pump-priming grant from the Department of Education and Science, and, in the case of some of the out-of-London groups, local education authority support. With the uncertainty about the future of much of the local funding for established out-of-London groups, the success of such a continuing scheme has brought severe financial pressure

upon the Royal Institution where funds for continuance of the in-house classes and expansion of the out-of-London groups were exhausted. As part of its Appeal for outside help, an application to the Clothworkers' Foundation was submitted to underwrite the Mathematics Masterclass programme and to extend it to many other geographical regions.

With this generous support the Royal Institution will appoint a part-time Fellow to help seed and sustain new classes, and a part-time administrative assistant. Among other things, two new out-of-London classes will be initiated each year and funded for three years so that, on a rolling basis, six such classes will be funded by the grant from the Clothworkers' Foundation every year. The Royal Institution intends to seed these new classes in many centres ranging from those with a growing technological base to the less fortunate areas where there is high unemployment.

Further particulars available from Miss M.J. Wright, Administrative Assistant (Education), The Royal Institution. Tel: 01-409 2992, ext. 726.

GOLDSMITHS' COLLEGE
University of London

CHAIR IN MATHEMATICAL SCIENCES

Candidates with interests in any area of the Mathematical Sciences, including Statistics and Computing, are welcome to apply for this newly-established Chair. It is anticipated that the person appointed will have a successful record in research and in attracting research funding. The post will be held from 1 January 1991 or as soon after as can be arranged.

Applications (10 copies) should be submitted to the Warden, Goldsmiths' College, New Cross, London SE14 6NW, from whom further particulars should first be obtained.

The College is an Equal Opportunities Employer.

The closing date for receipt of applications is 7 April 1990.

UMIST



**LECTURESHIP IN
PURE MATHEMATICS**

Applications are invited for the above post. It is anticipated that the appointment will run from 1 October 1990. Preference will be given to candidates whose field of study is in Algebra, Number Theory or Algebraic Geometry; however, applications from candidates in other fields will be seriously considered.

Commencing salary will be within the scale: £10,458-£20,469 per annum.

Requests for application forms and further details, quoting reference MAT/13, should be sent to: The Personnel Office, Registrar's Department, UMIST, PO Box 88, Manchester M60 1QD, as soon as possible.

An equal opportunity employer.

F. Verhulst, University of Utrecht

Nonlinear Differential Equations and Dynamical Systems

1990. IX, 277 pp. 107 figs. 2 tabs.

(Universitext) Softcover £ 13.50

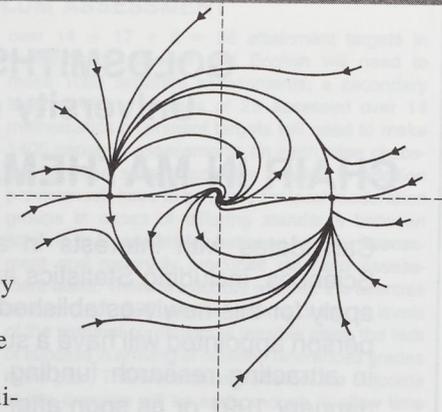
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On the subject of differential equations a great many elementary books have been written. This book bridges the gap between elementary courses and the research literature. The basic concepts necessary to study differential equations - critical points and equilibrium, periodic solutions, invariant sets and invariant manifolds -

are discussed. Stability theory is developed starting with linearisation methods going back to Lyapunov and Poincaré. The global direct method is then discussed.

To obtain more quantitative information the Poincaré-Lindstedt method is introduced to approximate periodic solutions while at the same time proving existence by the implicit function theorem. The method of averaging is introduced as a general approximation-normalisation method. The last four chapters introduce the reader to relaxation oscillations, bifurcation theory, centre manifolds, chaos in mappings and differential equations, Hamiltonian systems (recurrence, invariant tori, periodic solutions.).

The book presents the subject material from both the qualitative and the quantitative point of view. There are many examples to illustrate the theory and the reader should be able to start doing research after studying this book.



S. Wiggins, California Institute of Technology, Pasadena, CA

Introduction to Applied Nonlinear Dynamical Systems and Chaos

1990. Approx. 705 pp. 291 figs. (Texts in Applied Mathematics, Vol. 2)

Hardcover £ 35.00 ISBN 3-540-97003-7

This significant, forthcoming volume is intended for advanced undergraduate or first year graduate students as an introduction to applied nonlinear dynamics and chaos. The author has placed emphasis on teaching the techniques and ideas which will enable students to take specific dynamical systems and obtain some quantitative information about the behavior of these systems. He has included the basic core material that is necessary for higher levels of study and research. Thus, people who do not necessarily have an extensive mathematical background, such as students in engineering, physics, chemistry and biology, will find this text as useful as students of mathematics.

Overall, this will be a text that should be required for all students entering this field.

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Sir Joseph Larmor (1857-1942) was born in Magheragal Co. Antrim and educated at Queen's College, Belfast, and St John's College Cambridge, where he was senior Wrangler in 1880; he became Lucasian Professor in 1903. He wrote on electricity, dynamics, and thermodynamics; his **Aether and Matter** (1900) was re-named by Lamb **Aether and no Matter** because of its choice of emphasis. Independently of Lorentz he gave an approximate explanation of Fitzgerald contraction. He was knighted in 1909 and from 1911-1922 was MP for the University of Cambridge. The Royal Society awarded him its Royal Medal in 1915 and its Copley Medal in 1921. The London Mathematical Society, of which he was treasurer from 1892-1912, awarded him its De Morgan Medal in 1914. He was the Society's 26th President, from 1914-1916.

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.

1990

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- 2-6 British Mathematical Colloquium, East Anglia (166)(169)
- 2-6 British Theoretical Mechanics Colloquium, St Andrews
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- 3-8 Physical Interpretations of Relativity Theory, London (168)
- 16-22 Deutsche Mathematiker Vereinigung 100th Anniversary, West Germany (170)

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 01-437 5377, fax 01-439 4629, E-mail lms@uk.ac.kcl.cc.oak.