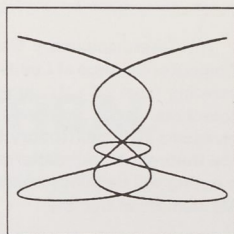


THE LONDON MATHEMATICAL SOCIETY NEWSLETTER



No. 138

March 1987

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Advertising: Susan Oakes, LMS Office, Burlington House, Piccadilly, London W1V 0NL. Tel: 01-437 5377.

The *Newsletter* is published monthly, except in August and September. Items for inclusion (with the exception of advertising material) should be sent to the Editor, to arrive before the tenth day of the month prior to publication. Advertisements, and general enquiries about the Society, should be addressed to Susan Oakes at the LMS Office.

Forthcoming Meetings

Friday 20 March 1987, Burlington House

(J.M. Ball, J.B. McLeod)

Friday 20 March 1987, Burlington House

(J.M. Ball, J.B. McLeod)

8-9 May 1987, Edinburgh

Joint meeting with Edinburgh Mathematical Society

(M. Christ, A.M. Davie, E.B. Davies, E.M. Stein, N.Th. Varopoulos)

Friday 19 June 1987, Burlington House

Friday 16 October 1987, Burlington House

Friday 20 November 1987, Burlington House

MATHEMATICAL PHYSICS 1988

The IXth Congress of the International Association of Mathematical Physics will be held in Swansea (United Kingdom) from 17th July to 27th July 1988. The Congress is supported by the SERC and LMS and other international academic bodies. The conference committee consists of: Professor B. Simon (Caltech), Professor J. Lewis (IAS Dublin), Professor Sir

Michael Atiyah (Oxford), Professor R.L. Dobrushin (Moscow), Professor D.E. Evans (Swansea), Professor J. Fröhlich (Zürich), Professor G. Jona-Lasinio (Rome), Professor D. Olive (London), Professor D. Ruelle (IHES Paris), Professor L. Streit (Bielefeld), Professor A. Truman (Swansea).

DOMAIN THEORY AT LEEDS

The interdisciplinary Centre for Theoretical Computer Science at Leeds University will hold a meeting from 26 - 27 June 1987 for computer scientists and mathematicians to discuss problems in domain theory and its applications to the theoretical foundations of computation. The meeting will be jointly sponsored by the London Mathematical Society.

Domains are to computation roughly as topological spaces are to continuity. The theory of domains and its application to the theory of programming languages, and to the theory of computable functions in higher types, have evolved from pioneering work by D. Scott and Y.

Ershov in the early 1970s.

At present the following have agreed to speak at the meeting: S. Abramsky (Imperial); T. Coquand (Paris); M. Hyland (Cambridge); W. Roscoe (Oxford); H. Schwichtenberg (Munich); M. Smyth (Imperial); V. Stoltenberg-Hansen (Uppsala).

To receive further information concerning the programme and accommodation please contact Dr J. V. Tucker, Department of Computer Studies, or Dr S. S. Wainer, Department of Pure Mathematics, University of Leeds, Leeds, LS2 9JT. (Telephone: 0532 431751).

SINGULARITY DAYS VII

This event will be held in the Department of Pure Mathematics at Liverpool 24 - 26 March 1987 (2 full days). All those listed below have accepted an invitation to speak, and LMS has awarded funds to support the conference. For further details please contact the department.

D.R.J. Chillingworth (Southampton) *Singularities of the energy-momentum map for a nearly symmetric top.*

J. F. Nye (Bristol) *Topological structure of*

electromagnetic fields.

M. Roberts (Warwick) *Critical points of functions on analytic varieties.*

C. Sabbah (Ecole Polytechnique) *Discriminants and functional equations.*

R. J. Turnbull (Liverpool) *Desingularisation and Thom polynomials*

K. Wirthmüller (Regensburg) *Discriminants of certain unimodular singularities of space curves.*

HARALD BOHR CENTENARY SYMPOSIUM

The Danish Mathematical Society will hold the *Harald Bohr Centenary Symposium* on April 24 - 25th 1987 in Copenhagen.

The main topic will be almost periodic functions in a broad sense, their history and applications. The organizing committee consists of: C. Berg, B. Fuglede and L.E. Lundberg.

Among the speakers will be: J. B  lissard, C.

Berg, N.N. Bogolubov, T. Bohr, A.M. Fink, S. Helgason, E. Hewitt, H. Tornehave.

Those interested in participating should write as soon as possible to: Danish Mathematical Society, "The Harald Bohr Centenary", Universitetsparken 5, DK-200 Copenhagen O, Denmark.

SUMMER SCHOOL IN PROBABILITY

The 1987 Saint-Flour Summer School runs from 1 - 18 July. The three courses will be:

L. Elie (Paris VII) *Marches al  atoires et fonctions harmoniques.*

K. D. Elworthy (Warwick University) *Some geometric aspects of diffusions on manifolds.*

E. Nelson (Princeton University) *Stochastic*

mechanics and random fields.

Further details may be obtained from Professor P. L. Hennequin, B.P. No. 45, 63170 Aubiere, France.

BACK ISSUES OF SOCIETY PUBLICATIONS

The following are available free to anyone who will collect them:

Journal 1947 - 1976

Proceedings 1948 - 1970

Bulletin 1969 - 1976

Also Proceedings of the American Mathematical Society 1966 - 1976. If you are interested, please contact J.C. Tanner, Half Way Tree, Wellington Avenue, Crowthorne, Berks. Tel: Crowthorne (0344) 772401.

LONDON MATHEMATICAL SOCIETY

J.B. McLeod (Oxford)
**THE OPTIMAL DESIGN OF AN
OPTICAL LENS**

J.M. Ball (Heriot-Watt)
**WEAK CONVERGENCE AND THE
CRYSTALLOGRAPHIC THEORY OF
MARTENSITE**

FRIDAY, 20 MARCH, 1987 at 3.30 p.m.

**Geological Society's Meeting Room
Burlington House
Piccadilly, London W1**

**All interested are very welcome
Tea will be served at 4.30 p.m.**

MATHEMATICAL INSTRUCTION SUBCOMMITTEE NEWSLETTER NO. 3

by Professor D.G. Crighton, Chairman of the MIS

The MIS has met once, in October, since the last MIS newsletter. We are now fully involved in our objective of informing the UK mathematical education community on matters relating to ICMI and, in particular, the forthcoming Congress on mathematical education - ICME-6 - to be held in Budapest in 1988. In particular, the MIS newsletters provide a channel of communication to everyone interested in information or advice on UK participation and contribution at ICME-6.

ICME-6, Budapest, 27 July to 3 August 1988

The International Programme Committee (IPC) has made further progress towards planning the programme for ICME-6. A new information sheet is available from the Royal Society (address below), giving the names and addresses of the Chief Organizers and where applicable, UK panel members, of each Action and Theme group. It includes a final list of Topic areas; details of the organizers for these are still awaited. A form for those considering making a presentation at ICME-6 is also available from the Royal Society. We have already received a number of potential contributions. These have been sent to the IPC and the relevant Action, Theme or Topic group chief organizers. Deadline for proposed contributions is 31 March 1987 or as soon as possible after that date. (Please note that the previous deadline for contributions, 31 December 1986, should be ignored) The deadline for submitting abstracts will appear in the Second Announcement from the Hungarian organizers which is due to appear in Summer 1987. Copies will be sent to everyone on the MIS mailing list (see below).

Also in the Second Announcement will be information about computer hardware, software and other technical devices and their compatibility; custom and visa regulations; baby sitting and other services; policy and exhibitions and projects; and the required form for abstracts for oral and poster presentations.

The plenary lectures at ICME-6 are confirmed as follows:

Professor László Lovász (Budapest) on 'Trends in mathematics with special emphasis on algorithmic ideas and their relevance to the learning and teaching of mathematics';
Professor Bienvenido Nebres (Manila) on 'Trends in school mathematics with special emphasis on the work of the ICMI study group on school mathematics in the 1990s and on the situation in Third World countries';
Professor Gérard Vergnaud (Paris) on 'Cognitive psychology relevant to the learning and teaching of mathematics including that relevant to

research in didactics'.

The sub-plenary lecture will be given by Academician Andrei Ershov (Novosibirsk) on the new course designed under his leadership for Soviet schools. Increasing concern about the social status of teachers in general, and of mathematics educators in particular, has moved the IPC to devote the whole of the fifth day of ICME-6 to a topic entitled 'Mathematics and society' (details on the information sheet available from the Royal Society).

UK planning for ICME-6

Four regionally-based public planning meetings for ICME-6 have been held at Bristol Polytechnic (18 October), Cambridge University (25 October), Manchester Polytechnic (1 November) and Edinburgh University (13 November). In each instance (with the exception of Edinburgh, where the meeting was solely concerned with ICME-6) the afternoon of a full-day meeting was devoted to ICME-6 affairs, organized by the MIS. The audiences identified many useful points on the organization and presentation of the Action, Theme and topic groups that will be brought to the attention of the IPC. The focus throughout was on how to encourage practising school teachers of mathematics to attend the Congress. Accordingly, the MIS has defined eight possible areas of concern that might interest teachers. In each case we would like to identify a working group of teachers and others, who would meet and discuss their common interest in the UK prior possibly to attending ICME-6. The intention is that those teachers who do attend the Congress will have a clearly defined area of interest and substantial participation to follow through within the international context of the Congress, whilst also remaining free to follow up other areas of interest in the programme. Alternative ideas on areas that could form the basis of workshops of interest to teachers should be passed to David Crighton (see (v) below).

The eight areas identified are:

- (1) *Primary mathematics* - including the PRIME project workshops on teaching style and the primary curriculum; LOGO; problem solving; maths in the curriculum; gender and primary maths. Further ideas are invited.
Coordinator: Dr Daphne Kerslake, Bristol Polytechnic (Tel: (0272) 741251).
- (ii) *School-based assessment* - GCSE will require between 20-50% school-based assessment. Such assessment, although common elsewhere in the world, will be unfamiliar to many teachers in England and

Wales. It will include assessment of pupils' oral responses, of their mathematical ideas, of their mental calculations, of practical and investigational work and of extended pieces of work. Further details on the position in Scotland and Northern Ireland with regard to school-based assessment are invited, as well as for England and Wales.

Coordinator: Mr P. Reynolds, Suffolk LEA (Tel: (0473) 55801 ext. 4356).

- (iii) *Microcomputers and mathematics* - There will be workshops at ICME-6 to allow participants to experience the wide range of UK software and curriculum materials covering the full range of activities at primary, secondary and tertiary level, and, where possible, for participants to have 'hands on' experience. It would be valuable to demonstrate materials which have been successfully used in practice in the UK, and in particular, those which may transfer to a wider environment. Further ideas are invited.

Coordinator: Professor D.J.G. James, Coventry Polytechnic (Tel: (0203) 24166).

- (iv) *Computer algebra* - This workshop is designed to consider the potential applications of a microcomputer-based algebra package in mathematical education at all levels. Such packages are capable of carrying out a variety of mathematical operations, for example, algebraic manipulation, differentiation and integration. Contributions are invited from those with experience in using such packages.

Coordinator: Professor D.J.G. James (see (iii) above).

- (v) *Mechanics in the sixth-form* - Mechanics remains the most suitable field in which to introduce students to the ideas of 'mathematical modelling'. A group of mathematicians in schools and universities in the North of England, has, over the past 6 years, developed a range of materials (written, visual, experimental), thoroughly tested in the classroom environment with the aim of helping teachers to convey the excitement of the subject and its continuing relevance to mathematics and science. Those who would like to see the 'teach mechanics kit' and other materials in action are invited to take part. Further contributions to mechanics teaching in schools are welcomed.

Coordinator: Professor D.G. Crighton, Cambridge University (Tel: (0223) 337860).

- (vi) *Classroom interaction* - A group in Bristol have produced in-service materials on classroom interaction for primary and secondary mathematics teachers.

Preliminary trials have worked well. The group is interested to hear from teachers interested in this area.

Coordinator: Dr Daphne Kerslake (see (i) above).

- (vii) *Profession of teaching* - (Theme group No. 1)

The programme is likely to involve: issues in in-service training, the evaluation of teachers, the impact of technology on the teacher's role, the nature of effective teaching, social demands on mathematics teaching, and projects and courses relating to low attaining pupils. UK contributors are likely to focus on: training organization and evaluation of ESG teachers and other in-service providers, the development of 'long term' courses and their modularization, in-service support for GCSE, and the development of 'whole school' in-service provision. Further ideas and contributions are invited.

Coordinator: Dr D. Woodrow, Manchester Polytechnic (Tel: 061-445 7871).

- (viii) *Teaching mathematics at ages 16-19* - This will consider post 16 mathematics; student-centered work such as open learning; sandwich courses in conjunction with modular units of mathematics; and workshops to help students with gaps in their mathematical knowledge. Technical, business and craft mathematics, mathematics as a service subject, general mathematics courses and micro-computer skills, will be explored. Further ideas and contributions are invited.

Coordinator: Mrs C. Knox (Tel: (0742) 301143).

Mathematics teachers interested in any of the topics above should contact the coordinators.

Finance and travel arrangements for ICME-6

The MIS is intending to accumulate and manage, as far as possible, a single central fund for ICME-6. A list of potential sponsors from industrial, and commercial and other sources is being drawn up. Donations specifically for use by practising mathematics teachers will be encouraged. The fund will be disbursed under the direction of the MIS. An announcement will appear later this year in the newsletter, and also be distributed to all those on the mailing list (see below), about how and when to apply.

UK mailing list

If you are not already on the UK mailing list for information about ICME-6, you should write to the address below, giving information as follows:

- (a) if you are proposing to offer a presentation at ICME-6,
(b) if you expect to attend ICME-6,

- (c) if you attended ICME-5,
- (d) *brief* information about your professional interests and activities.

Other international activities on mathematical education

The International Statistical Institute Round Table Conference on 'Training teachers to teach statistics' is provisionally planned for 23-27 July 1988 in Budapest, immediately prior to ICME-6. Inquiries or suggestions from people concerned with statistical training of teachers, either in respect of the Round Table Conference or the statistical education component of the ICME-6 programme, are welcomed and should be

directed to Mrs A.S. Hawkins, Centre for Statistical Education, University of London Institute of Education, 20 Bedford Way, London, WC1H 0AL, (Tel: 01-636 1500, ext 447).

The next MIS newsletter

The next MIS newsletter will appear in about six months. It will include the details received in the Second Announcement on ICME-6. There will be further details of the sponsorship drive and how and when to apply.

For further MIS information or to join the UK mailing list please contact: Jill A. Nelson, The Royal Society, 6 Carlton House Terrace, London, SW1Y 5AG, (Tel: 01-839 5561, ext 266).

VISIT OF ACADEMICIAN S. P. NOVIKOV

Academician S. P. Novikov (Landau Institute for Theoretical Physics, Moscow) will be visiting Imperial College, London to attend the Schrödinger Centenary Conference (31/3/87 - 3/4/87). Through the financial support of the L.M.S., it is hoped that he will also be able to

spend most of the preceding month (i.e. March 1987) in this country. It is planned for him to visit Oxford, Cambridge and Leeds as well as Imperial College. Further details may be obtained from Dr. G. Wilson, Imperial College, London (Tel: 01-589 5111, Ext. 5815).

ONE-DAY COMBINATORICS COLLOQUIUM

A one-day Combinatorics Colloquium, supported by the British Combinatorial Committee, will take place at the University of Reading on Wednesday 29 April 1987. The following have agreed to speak: N. L. Biggs, S. A. Choudum, J. Dénes, R. Diestel, J. W. Essam, A. D. Gardiner, J. D. Key, M. Lewin, D. H. Smith, R.

Thomas. Lectures will start at about 10.15 a.m. Further details may be obtained from Professor C. St. J. A. Nash-Williams, Department of Mathematics, University of Reading, Whiteknights, P.O. Box 220, Reading, Berkshire RG6 2AX, telephone (0734) 875123 ext 429.

VISITING MATHEMATICIANS

University of Warwick

See the February issue of the *Newsletter* for Operator Algebras and applications Symposium participants. The following are visitors who are not part of the Symposium.

O. Brison (Lisbon University)
C. Georgiou (Ioannina University)

C. Holmes (Miami University)
L. Markus (Minnesota University)
P.F.S. Porto (Sao Carlos Univ)
S. Rosenberg (Boston University)
I. Simao (Lisbon University)
W. Zheng (E. Normal China Univ.)

HYPERBOLIC PROBLEMS

The Second International conference on Hyperbolic Problems will be held from 13 - 18 March 1988 at RWTH Aachen, Fed. Rep. of Germany under the chairmanship of J. Ballmann (Aachen) and R. Jeltsch (Aachen).

The first international conference on Hyperbolic Problems was held in St. Etienne, in 1986.

Systems of non linear hyperbolic problems play an important role in science and technology, e.g. aerodynamics, multiphase flows with cavitation, nonlinear waves in solids, flow in porous media, plasma physics, astrophysics, combustion problems, oil extraction, biology. In

the last few years, significant advances have been made in the exact and approximate solution of systems of non linear hyperbolic equations and their applications. The aim of the conference is to bring together scientists in the field for a presentation of recent results and to discuss future research. The main topics are:

1. Theory of non linear hyperbolic systems.
2. Numerical methods for solving these systems.
3. Applications.

Further details may be obtained from: Rolf Jeltsch, Institut fuer Geometrie und Praktische Mathematik, RWTH Aachen, D-5100 Aachen, Fed. Rep. of Germany.

NUMERICAL METHODS IN FLUID MECHANICS

As previously announced, the GAMM-Committee for Numerical Methods in Fluid Mechanics, in cooperation with the Université Catholique de Louvain, Louvain-la-Neuve, Belgium organizes the Seventh GAMM Conference on Numerical Methods in Fluid Mechanics from 8 - 11 September 1987 at the Faculté des Sciences Appliquées, UCL, Louvain-la-Neuve, Belgium.

The conference is intended to bring together scientists who are working on the theory or the application of numerical methods in fluid mechanics. The main objective is to foster exchanges between the various fields of development of computational fluid dynamics such as Aerodynamics, Hydrodynamics, Propulsion, Fluidmachinery, Nuclear Reactor Technology, Meteorology, Biomechanics, Heat Transfer in Fluids, etc.

About 50 papers will be presented. The duration of each presentation will be 20 min. plus 10 min. for discussion. Special sessions will be held for the discussion of problem areas which have been treated in GAMM-workshops. Conference language is English.

Prospective contributors are invited to submit sufficiently detailed abstracts of 1 to 2 pages of

text, plus tables, figures or sketches, by March 16, 1987. The abstracts should include: field of study, definition of problem, approach, results and conclusions. The emphasis should be on the development of novelties in methods or in the numerical approach to the problem. The submitted abstracts should concern unpublished work. A selection of the papers will be made on the basis of these abstracts. Authors will be notified of acceptance by May 18, 1987.

The proceedings will be published shortly after the meeting by the Vieweg-Verlag in the series "Notes on Numerical Fluid Mechanics". The number of pages (without charges) of the paper shall not exceed 8, including references, figures and tables. Typing instructions and framed paper will be sent to the authors upon notification of acceptance. Deadline for submission of manuscripts is 11 September, 1987. A book of abstracts will be made available to the participants at the meeting, based on more detailed abstracts of 4 pages at maximum to be received by 1 August, 1987.

Further details may be obtained from Prof. M. Deville, Unité de Mécanique Appliquée, 2, Place du Levant, 1348 Louvain-la-Neuve, Belgium.

WELDON MEMORIAL PRIZE

The Electors have awarded the Weldon Memorial Prize for 1986 to Professor Tomoko Ohta, Professor of Population Genetics, National Institute of Genetics, Japan. Professor Ohta is

distinguished for her numerous contributions to mathematical population genetics, and especially for showing how this subject can be linked to new discoveries in molecular biology.

1988 APPLIED MATHEMATICS CONFERENCE

The 1988 Australian Applied Mathematics Conference will be held at Leura in the Blue Mountains near Sydney from 7 February to 11 February, 1988. Further information is available

from Prof. R. Grimshaw or Dr. W.D. McKee at the School of Mathematics, U.N.S.W., Box 1, Kensington, N.S.W. 2033, Australia.

1988 ST. ANDREWS COLLOQUIUM

The 1988 St Andrews Colloquium will take place from 13 to 20 July 1988. There will be three main lecture courses, plus the E.T. Copson Memorial Lectures, and additional research seminars.

Further details are available from J. K. Langley, the Colloquium Secretary at the University of St. Andrews.

THEORETICAL PHYSICS

The following Mathematics activities will be held at the International Centre for Theoretical Physics:

Espaces fibrés: leur utilisation en physique (27 April - 1 May 1987)

College on Riemann Surfaces (9 November - 18 December 1987).

Further details may be obtained from Professor James Eells.

SINGAPORE GROUP THEORY

The Singapore Group Theory Conference is organised jointly by the Department of Mathematics of the National University of Singapore and the Singapore Mathematical Society, and is sponsored by the Southeast Asian Mathematical Society. The Conference will be held at the National University of Singapore from 8 to 19 June 1987.

The Workshop (8 - 10 June)

The Workshop lecturers and the titles of their lectures are as follows:

- (1) O.H. Kegel
Sylow theory in locally finite groups
 - (2) D.J.S. Robinson
Homological methods in infinite group theory
 - (3) J-P. Serre
 - (i) Galois groups over \mathbb{Q}
 - (ii) A short introduction to Tits buildings
 - (iii) Trees, and groups acting on trees
- (1) and (2) will each consist of four one-hour lectures and (3) will consist of a one-hour lecture

on each of the three topics.

The Conference (11 - 19 June)

Invited lectures will be given by: M. Broué, W. Feit, K.W. Gruenberg, M. Hall, B. Hartley, G. Higman, N. Ito, O. H. Kegel, B.H. Neumann, D.J.S. Robinson, J-P. Serre, M. Suzuki, J. G. Thompson.

There will be sessions for contributed 30-minute papers. Abstracts for contributed papers should reach the Organising Committee by 31 March 1987. Abstracts should be typewritten with double spacing and wide margin (at least 2.5 cm) on A4-size paper and should not exceed one page. The proceedings of the Conference will be published. The official language of the Conference will be English.

If you wish to attend the Conference please write to: Singapore Group Theory Conference 1987, Department of Mathematics, National University of Singapore, Kent Ridge, Singapore 0511, Republic of Singapore.

KAREN UHLENBECK

Professor K. K. Uhlenbeck will be visiting England from 9 to 22 March 1987. Her visit is partly financed by the LMS. She will give lectures on 13 March at Durham University, and on 17

March at Oxford University. For further details, contact Simon Donaldson, tel (0865) 273549, or Richard Ward, tel (0385) 64971 ext 454.

UNIVERSITY OF BATH

School of Mathematical Sciences

A new M.Sc. programme in Nonlinear Mathematics starting October 1987

In Research and Industry there is an ever-growing demand for mathematicians with knowledge of nonlinear theories. This programme will cater for students from a wide range of backgrounds and aims to equip them for modern nonlinear research in Mathematics, Science and Technology. Among the courses offered are

Applied Nonlinear Analysis	Nonlinear Analysis of Composite Materials
Convex Analysis and Variational Principles	Topics in Nonlinear Elastostatics
Nonlinear Elasticity and Phase Transitions	Geometry and Modern Physics
Mathematical Biology	Reaction-Diffusion Equations
Dynamical Systems: Stability and Control	Symmetry and the Maximum Principle
Numerical Solution of Nonlinear Boundary-Value Problems	
Numerical Methods for Bifurcation Problems	
Analytical Problems in Elastostatics	
Non-smooth Analysis and Optimal Control Theory	

In addition to the coursework, students will prepare a dissertation.

Get all the details from Professor J F Toland School of Mathematical Sciences, University of Bath, Bath, Avon, BA2 7AY. Telephone (0225) 826188.