

Report on Ninth Leslie Fox Prize Meeting

The Leslie Fox Prize meeting was held at the University of Dundee on Monday July 29 1999.

As usual, the finalists were chosen to give their oral presentations on the day from written papers submitted to the adjudicators earlier in the year. On this occasion, the standard of the nineteen submitted entries was as high as ever and the selection process was not an easy one. However, the quality of the six presentations at the meeting clearly showed that outstanding papers had been chosen. For the record, the breakdown of submissions was 7 from USA, 9 from Europe and 3 elsewhere. There were 8 papers submitted in linear algebra, 3 in linear and nonlinear optimization, and 6 in partial differential equations.

In now time-honoured fashion, the order of the presentations was determined randomly, calculated by the chairman applying a combination of permutations provided by the other adjudicators to an alphabetically ordered list.

It was thus the responsibility of Vincent Heuveline from Heidelberg (ex IRISA, Rennes) to commence proceedings with a well illustrated talk on using the Arnoldi-Faber method for large non-Hermitian eigenvalue problems. He developed both theory and algorithms for using Faber polynomials in a restarting scheme for Arnoldi's method, determining the required parameters using a Schwarz-Christoffel transformation after choosing a polygon to enclose the unwanted eigenvalues.

Some experiments using MATLAB established the viability of this approach and showed better performance than Chebyshev acceleration based on encircling ellipses.

Aurelian Bejancu from Cambridge discussed the convergence properties of surface spline interpolation. In this presentation, he first introduced surface splines constructed using a parameterized radial basis function. This more theoretical contribution used some elegant math-

ematics to prove local convergence of the interpolation for smooth functions and to provide a measure for the rate of convergence.

After the morning coffee break, Paul Houston of Oxford (now at Leicester) gave a very clear exposition of adaptive Lagrange-Galerkin methods for unsteady convection-diffusion problems and did a particularly good job of following the guidelines in making his presentation accessible to a general numerical analysis audience. The talk showed how a posteriori error analysis could be used to drive the adaptive algorithm and examples were presented to illustrate its use in practice.

The last presentation of the morning was by Reha Tutuncu of Carnegie Mellon University who gave a very colourful presentation on the quadratic convergence of potential-reduction methods for degenerate problems. He made excellent and effective use of Powerpoint software to describe his primal-dual interior-point method, to demonstrate its polynomial time complexity and its convergence even in the case of degeneracy.

After an excellent lunch in

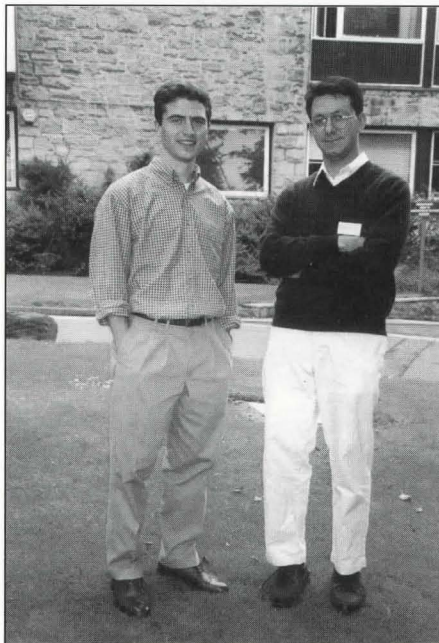
Belmont Hall (no doubt enjoyed by four of the finalists), Ross Lippert from Sandia National Laboratories began the afternoon session with a talk on the geometry of double eigenvalues. In his presentation, he skilfully presented geometric views of matrices as objects in n^2 dimensional space and characterized deficient matrices as lying on a $n^2 - 1$ dimensional surface. Ideas from differential geometry were used to show how matrices with repeated eigenvalues closest to a given matrix could be characterised.

The presentations were completed by Niles Pierce from CalTech (ex-Oxford) who talked on adjoint recovery of superconvergent functionals from PDE approximations. He very clearly showed how duality could be used to obtain estimates of integral functionals (for example lift or drag) that were twice as accurate as the computed flow solution from which they were computed.

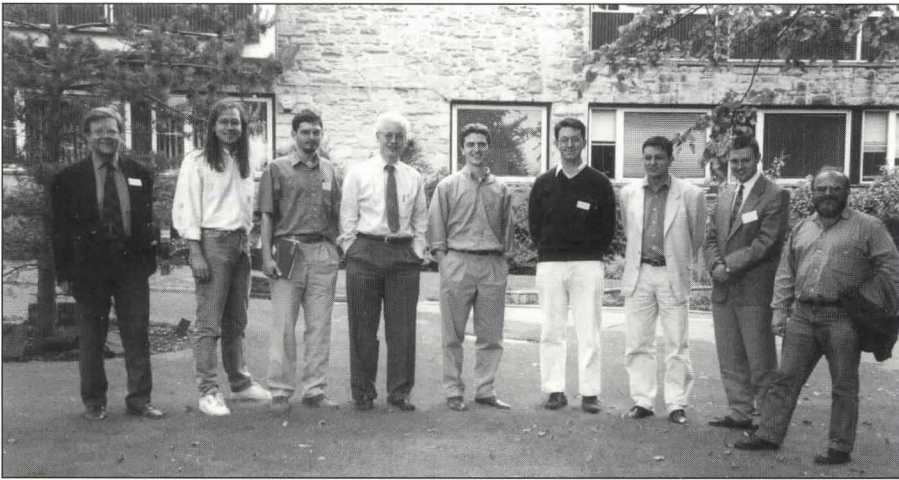
The adjudicating committee of Iain Duff (chairman), Nick Trefethen, and Arieh Iserles then adjourned to leave audience and speakers in a high state of tension over their afternoon tea. As was expected, even when the finalists were selected, the task of choosing a First Prize winner was a most daunting one. One thing that was easy was to award secondary prizes to all the other finalists as all were certainly worthy of this honour.

The decision, based both on quality of paper, importance of work, and presentation was to award two First Prizes. One to Reha Tutuncu for his outstanding presentation of an original approach to interior-point methods, and the other to Niles Pierce for a very clear exposition of a potentially extremely important development in computational fluid dynamics.

The chairman of the Adjudicating Committee concluded by thanking everyone involved, all the candidates, the finalists, the audience and our colleagues from the University of Dundee for an excellent day celebrating several aspects of numerical analysis, an event which I am



Niles Pierce, on the left, and Reha Tutuncu



Prize winners and adjudicators

sure Leslie himself would have very much enjoyed and been proud to have his name associated with.

Nick Trefethen then announced that the next Leslie Fox Prize meeting would be held in Oxford, probably on

the Friday before the Dundee conference in 2001.

Let me finish this report with a call for further contributions to support the Leslie Fox prize Fund. At the moment, the Prize is more symbolic than monetary but it would be nice to give prize winners better recompense for their efforts. Contributions can be sent to the Leslie Fox Prize Fund, c/o IMA in Southend-on-Sea. Further information on the Leslie Fox Prize and lists of past prizewinners can be found on the Web page <http://www.numerical.rl.ac.uk/isd/fox.html>.

Iain Duff C.Math.FIMA
Rutherford Appleton Laboratory

3rd Quadrennial Congress European Mathematical Society Barcelona, 10–14 July 2000

Lotus Conferences & Incentives are pleased to advise that a special group travel scheme has been planned for participants and accompanying persons attending the above event. Arrangements allow some flexibility enabling participants the opportunity of combining their stay with other meetings or holiday purposes.

Prices start from £395.00 per person (based on sharing a twin room):

MONDAY 10 JULY Scheduled air travel London to Barcelona with either British Airways or Iberia (including airport taxes) and private transfer to the hotel of your choice for 5 nights accommodation on a bed & breakfast basis including service and tax.

SATURDAY 15 JULY Private transfer to the airport for scheduled air travel Barcelona to London.

Financial security All tour arrangements are protected under the Air Travel Organisers Licence (ATOL 3265) and licensed by the Civil Aviation Authority.

For full details please contact **GRAZIANO FONTANINI** at Lotus Conferences, Sandpiper House, 39 Queen Elizabeth Street, London SE1 2BT Tel: 0171 962 9030 Fax: 0171 334 0997 E-mail: Conferences@lotusgroup.co.uk

Ninth International Congress on Mathematical Education

Tokyo/Makuhari, Japan
31 July–6 August 2000

ICME is a major congress which takes place on a four yearly basis and attracts around 4000 delegates from all parts of the world. Recent congresses have been held in Budapest, Quebec, and Seville. The objective of the congress is to increase the development of mathematics education in order to improve the learning and teaching of mathematics. This is achieved through lectures, working and topic groups, presentations, projects, films and special exhibits.

The Institute is willing to provide financial assistance to enable one or more members who teach mathematics in a school or FE college to attend the congress. Further details and application forms for ICME can be obtained from the ICME-9 Secretariat: Professor Toshio Sawada, Department of Mathematics, Science University of Tokyo, 26 Wakamiya, Shinjuku-ku, 162-0827 Tokyo, Japan. icme9@ma.kagu.sut.ac.jp Fax +81-3-3260-7823. Please provide your name, title, gender, affiliation, mailing address, telephone and fax numbers and e-mail address. Alternatively, visit the congress web site: <http://www.ma.kagu.sut.ac.jp/~icme9/>.

Applications for financial assistance should be sent to the Institute at Catherine Richards House by 3 December 1999.