

MATRIX THEORY CONFERENCE

A conference on Matrix Theory and its Applications was held in University College Dublin on March 22-24. The conference was organized by F.J. Gaines and T.J. Laffey, and was sponsored by the Department of Mathematics, U.C.D., the Irish Mathematical Society and the Symposium Fund of the Royal Irish Academy. It was well-attended, with about 35 participants. The lectures and discussion covered the many aspects of matrix theory - algebraic, analytic, combinatorial and computational - as well as its applications in applied mathematics. There was also a stimulating problem session, with several challenging questions.

The lecturers in order of appearance were as follows:

- Professor G.N. De Oliveira (Coimbra) *Matrices over finite fields*
- Professor T.T. West (T.C.D.) *Left/Right Symmetry in semi-simple algebras*
- Professor T.J. Laffey (U.C.D.) *Factorization of matrices as products of Skew-symmetrics*
- Professor R. Grone (Auburn, Alabama) *Computation of an immanant*
- Dr R. Timoney (T.C.D.) *Reinhardt decompositions of operator matrix spaces*
- Dr D.W. Lewis (U.C.D.) *Hermitian forms and von Neumann regular matrices*
- Dr E.P. O'Reilly (N.I.H.E. Dublin) *The recursion method - a matrix technique in solid state physics*
- Dr N.B. Blackhouse (Liverpool) *Grassman matrices*
- Professor F. Holland (U.C.C.) *Counterparts of Hankel and Toeplitz operators on C^p*
- Dr R. Gow (U.C.D.) *Some properties of unitary matrices*
- Dr D. O'Connor (U.C.D.) *Sparse matrices*
- Professor H. Wimmer (Wurzburg) *The algebraic Riccati equation*

T. Laffey

REPORT OF THE NASECODE III CONFERENCE

(Communicated by J.J.H. Miller of the Numerical Analysis Group, Dublin)

The third international conference on the Numerical Analysis of Semiconductor Devices and Integrated Circuits, NASECODE III, was held in Galway, Ireland, from June 15th to 17th, 1983, under the auspices of the Numerical Analysis Group. It was attended by over 120 delegates from 18 countries. The aim of this series of conferences is the fostering of a fruitful exchange of ideas between electronic engineers and numerical analysts, who are using existing and developing new computer codes for semiconductor process, device and integrated circuit modelling.

As on previous occasions the industrial sector was strongly represented and it is our policy to ensure that the topics discussed at these conferences are relevant to the needs of industry. This ensures that the scientific and technical material presented at the conference is not only intellectually challenging, but also of great practical importance.

The application of numerical methods to semiconductor device modelling began about 17 years ago, and since then it has developed and broadened in scope very rapidly. To date relatively few professional numerical analysts have worked in this area, and consequently it is still a fertile source of stimulating unsolved problems of widely varying degrees of difficulty.

The models of technological importance are mainly in two space dimensions and they may also be time dependent. Typically, two or three nonlinear differential equations have to be solved on complicated domains with a variety of boundary conditions. Computational experience indicates that the systems are often very stiff.

For the numerical analyst there is a wealth of problems. Frequently, underflow and overflow occur and special tricks have to be used to allow the computation to proceed. Convergence of the iterative method for solving the discrete nonlinear system is usually a problem. The very fine meshes generally used in certain parts of the domain give rise to large discrete systems, and consequently the systems to be solved after linearisation are large. Many standard linear equation solvers, both direct and iterative, are impractical or simply fail for these problems. The development of practical and efficient techniques for solving extensions of these problems to three space dimensions and to the non-stationary case are also needed.

For a representative collection of papers on the subject the reader may consult the five publications [1], [2], [4], [9] and [10] associated with the NASECODE conferences. The first two monographs on the subject are Kurata [3] and Mock [5]. The main journals covering engineering aspects are [6] and [7], while the more computational and mathematical aspects are discussed in journal [8]. The fourth conference in the series, NASECODE IV, will be held in Dublin, Ireland, from June 9th to 21st, 1985.

Bibliography

- [1] B.T. Browne and J.J.H. Miller (eds), Numerical Analysis of Semiconductor Devices, Proceedings of the NASECODE I Conference, Boole Press, Dublin (1979).
- [2] B.T. Browne and J.J.H. Miller (eds), Numerical Analysis of Semiconductor Devices and Integrated Circuits, Proceedings of the NASECODE II Conference, Boole Press, Dublin (1981).
- [3] M. Kurata, Numerical Analysis for Semiconductor Devices, Lexington Books, Massachusetts (1981).
- [4] J.J.H. Miller (ed.), An Introduction to the Numerical Analysis of Semiconductor Devices and Integrated Circuits,

- Lecture Notes of a Short Course held in association with the NASECODE II Conference, Boole Press, Dublin (1981).
- [5] M.S. Mock, Mathematical Analysis of Semiconductor Devices, Boole Press, Dublin (1981).
 - [6] I.E.E.E. Transactions on Electron Devices, The Institute of Electrical and Electronics Engineers, New York.
 - [7] Solid-State Electronics - An International Journal, Pergamon Press, Oxford.
 - [8] COMPEL - The International Journal for Computation and Mathematics in Electrical and Electronic Engineering, Boole Press, Dublin.
 - [9] J.J.H. Miller (ed.), NASECODE III, Proceedings of the Third International Conference on the Numerical Analysis of Semiconductor Devices and Integrated Circuits, Boole Press, Dublin (1983).
 - [10] J.J.H. Miller (ed.), Finite Element Programming with Special Emphasis on Semiconductor Device and Process Modelling, Lecture Notes of a Short Course held in association with the NASECODE III Conference, Boole Press, Dublin (1983).

IRISH MECHANICS GROUP

(Conference of the Irish Mechanics Group held at the Dublin Institute for Advanced Studies on 17th April, 1984)

The opening lecture was given by Dr R.K. Li of Trinity College, Dublin, who spoke on "Scalar polynomial linear flow potentials". He was followed by Dr D.W. Reynolds of N.I.H.E. whose topic was "The buckling of viscoelastic rods" and a lecture by Prof. J.N. Flavin of U.C.G. on "Some asymptotic bounds for end-bonded elastic cylinders" brought the first session to a close.

The second session consisted of three lectures. The first one on "Slow perturbations of fast plane shear flow of a