Proceedings of the

CENTRE FOR MATHEMATICS

AND ITS APPLICATIONS

AUSTRALIAN NATIONAL UNIVERSITY

Volume 38, 2000

NEMACOM

New Methods in Applied and Computational Mathematics Workshop

(Queensland, July, 1998)

Edited by

Roderick Melnik, Suely Oliveira and David Stewart

New Methods in Applied and Computational Mathematics

Proceedings of the New Methods in Applied and Computational Mathematics (NEMACOM98) held at Hervey Bay, Queensland, Australia, 9th July, 1998.

Edited by

Roderick Melnik
Department of Mathematics and Computing
University of Southern Queensland

Suely Oliveira
Department of Computer Science
University of Iowa

David Stewart
Department of Mathematics
University of Iowa

Preface

In July 1998 the first NEMACOM (NEw Methods in Applied and COmputational Mathematics) workshop was held at the campus of the University of Southern Queensland at Hervey Bay on the Wide-Bay–Burnett coast of Queensland. At the workshop a number of different topics in applied and computational mathematics were presented ranging from computational statistics and stochastic processes, through optimization, optimal control, graph theoretic methods in computational mathematics, the use of dynamical systems techniques for meteorology, modelling the solar atmosphere and geo-hydrological processes, simulating rigid-body dynamics, and the future of the Fast Fourier Transform. In this proceedings we present papers covering a selection of the topics presented. We would like to thank all those who participated in NEMACOM98 for attending, and for their contributions to this proceedings.

We would also like to thank

- the Australian Mathematical Society, and
- Numerical Algorithms Group plc, Oxford, UK

for their financial support for NEMACOM98. We would also like to thank the Centre for Mathematics and its Applications at the School of Mathematical Sciences, Australian National University for publishing this proceedings.

Roderick V.N. Melnik
Toowoomba, Queensland, Australia

Suely Oliveira
David E. Stewart
Iowa City, Iowa, USA.

Contents

Speakers and Contributors

Keynote speakers

- *Prof. Alan Edelman*,
  Applied Mathematics, Massachussets Institute of Technology, USA.
  Keynote talk: *The Future Fast Fourier Transform?*
- *Dr. Stephen J. Wright*,
  Argonne National Laboratories, Illinois, USA.
  Keynote talk: *Modifying the Cholesky factorization in interior-point methods.*

Contributing speakers and authors

- *Dr. Lutz Grosz*,
  Rechenzentrum, Universität Karlsruhe, Germany.
- *Dr. Roderick V.N. Melnik*,
  Department of Mathematics and Computing, University of Southern Queensland, Australia.
- *Prof. Suely Oliveira*,
  Department of Computer Science, University of Iowa, USA.
- *Dr. Irene Pestov*,
  Bureau of Rural Sciences, Australian Geological Survey, ACT, Australia.
- *Dr. Danny Ralph*,
  Department of Mathematics and Statistics, University of Melbourne, Australia.
- *Prof. A.J. Roberts*,
  Department of Mathematics and Computing, University of Southern Queensland, Australia.
- *Dr. Glen Skiller*,
  Department of Mathematics, Queensland Institute of Technology, Australia.
- *Prof. David E. Stewart*,
  Department of Mathematics, University of Iowa, USA.
- *Dr. Mozheng Wei*,
  Department of Atmospheric Research, CSIRO, Victoria, Australia.
- *Dr. Warren Wood*,
  Department of Mathematics, University of Newcastle, Australia.
- *Dr. Yi Xiao*,
  Bureau of Meteorology, Australia.