

Preface

Computational mathematics has more than 'come of age'; it has multiplied, so that it is no longer a science, but a family of sciences. It is a pleasure to present this special issue on Computational mathematics to the IISc community. Needless to say, a special issue like this can, at best, give a glimpse of a few of its facets, and hope that it is representative in a small way and enticing enough for people, not already deep into it, to want to take a plunge.

The first two papers of the issue are survey articles by Vanninathan. The first article is on efficient numerical schemes and properties of solutions of differential equations (ODEs and PDEs). The second is a survey on the use of wavelets in the study of partial differential equations and the numerical analysis of their solutions. Both papers appeared in altered form as status reports in the DST's (Department of Science and Technology, Govt. of India) Vision Paper on Mathematics (see *Mathematics Newsletter* of the Ramanujan Mathematical Society, Chennai, Vol 6, no. 4; Vol 7, nos 1 and 2, edited by R. Balakrishnan, Annamalai University). Special thanks are due to Dr. B. D. Acharya of DST and Professor K. B. Sinha, Indian Statistical Institute (ISI), New Delhi, Chairman of DST's Programme Advisory Committee for Mathematics, for their kind permission to publish these articles.

The remaining papers in the issue are research papers that illustrate three different aspects of computational mathematics. The paper by Vasudeva Murthy introduces a novel viscous perturbation of the Constantin–Majda–Lax ID model for the 3D vorticity equation to postpone the blow-up due to finite-time singularities. The paper by Bharath and Borkar presents robust algorithms for parametric optimization of hidden Markov models by combining Fabian's sign algorithm, stochastic approximation and gradient estimation techniques. The last paper by Chandru and Trick is on the computational complexity of non-smooth optimization techniques for Lagrangean constraint relaxation in discrete optimization.

I would like to thank the Associate Editor, Professor V.S. Borkar, for his encouragement and Ms. R. Geetha for help with the production of this special issue.

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