

with GLIM modelling methods for a greater variety and complexity of survival models.

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**17[76-06, 76T05].**—JOSÉ FRANCISCO RODRIGUES (Editor), *Mathematical Models for Phase Change Problems*, Internat. Ser. Numer. Math., Vol. 88, Birkhäuser, Basel, 1989, x+410 pp., 24 cm. Price \$76.00.

These are the proceedings of a workshop held at Óbidos, Portugal, October 1–3, 1988. There are 20 contributions, organized in three chapters entitled: Generalized Phase Changes, Stefan Problems, and Miscellaneous Problems. While the emphasis is on mathematical modeling, several contributors also address computational issues.

W. G.

**18[65-06, 65Dxx].**—TOM LYCHE & LARRY L. SCHUMAKER (Editors), *Mathematical Methods in Computer Aided Geometric Design*, Academic Press, Boston, 1989, xv+611 pp., 23  $\frac{1}{2}$  cm. Price \$49.95.

This volume grew out of an international conference on the topic of the title, held at the University of Oslo, Norway, June 16–22, 1988. Its content is accurately described on the back cover of the book: "The volume contains survey papers as well as full-length research papers. The mathematical objects discussed include univariate and multivariate splines, algebraic curves, rational curves and surfaces, Bézier curves and surfaces, and finite elements. The topics treated include scattered data interpolation, geometry processing, convexity and shape preservation, subdivision, knot insertion and removal, knot selection for parametric curves, geometric continuity, and cardinal interpolation."

W. G.

**19[68U30, 68N05].**—DAVID V. CHUDNOVSKY & RICHARD D. JENKS (Editors), *Computer Algebra*, Lecture Notes in Pure and Applied Mathematics, Vol. 113, Marcel Dekker, New York and Basel, 1989, ix+240 pp., 25  $\frac{1}{2}$  cm. Price: Softcover \$99.75.

The book consists of a collection of articles related to the Conference on *Computer Algebra as a Tool for Research in Mathematics and Physics*, held at New York University in April 1984. This conference was the first of the *Computers & Mathematics* series, the latest of which was held at Massachusetts Institute of Technology in July 1989. The papers cover a diverse range of subjects with the emphasis on either computer use to carry out mathematical

investigations with very complex expressions, or on the description of certain such computer systems.

The article by D. Chudnovsky and G. Chudnovsky deals with how to use computers to investigate diophantine approximation via functional approximation methods; in particular, Padé approximations. The paper constitutes about one third of the entire volume. A short article by H. Cohn reports on computing certain Hilbert modular equations. G. Andrews investigates, using the Scratchpad system, summation-product identities arising in various contexts; among them, the famous Rogers-Ramanujan identities. R. Askey points to difficult multidimensional definite integrals of special functions for the need of using computers to handle the complicated algebra necessary in their proofs. D. Ford and J. McKay give a brief account of how one would determine the Galois group of a rational polynomial. The paper by L. Auslander and A. Silberberg and the paper by J. Cooley describe the application of the Scratchpad systems in the search for better convolution algorithms.

The systems described are the Cayley system for finite group theory in the article by M. Slattery, who exhibits several example sessions; the special-purpose system POLYPAK for computing very high-order series solutions of differential equations in celestial mechanics, described by its designer D. Schmidt; and a Fortran library by R. Riley (called the PNCRE system) for manipulating finitely generated subgroups of  $SL_2(\mathbb{C})$ .

J. Davenport's paper discusses several issues arising in data abstraction and representation when building a computer algebra system. The book ends with a transcript (taken by Davenport) of a panel discussion on "The Potential of Computer Algebra as a Research Tool" held during the conference. The panel members were R. Askey, M. E. Fisher, J. McCarthy, J. Moses, and J. Schwartz. As a participant of the conference and the panel discussion, I found it quite useful to have a written record of what was said then—four years ago—about this field.

Overall, the book has the flavor of a conference proceedings (with an index of key terms), and certainly provides glimpses into the possibilities of using computers for doing mathematics. I find it a good addition to my collection of works on computer algebra.

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**20[18-04, 55-04, 55Q05, 68Q40].**—MARTIN C. TANGORA (Editor), *Computers in Geometry and Topology*, Lecture Notes in Pure and Applied Mathematics, Vol. 114, Dekker, New York and Basel, 1989, viii+317 pp., 25  $\frac{1}{2}$  cm. Price \$99.75.

These lecture notes contain fourteen papers arising from the Conference on Computers in Geometry and Topology, held on March 24–28, 1986, in Chicago.