

# Six-Year Index of “Computers and Mathematics”

*compiled by Keith Devlin and Nancy Wilson*

The “Computers and Mathematics” section of the *AMS Notices* ran from the summer of 1988 through to the last issue of 1994, at first with Jon Barwise as editor, later with Keith Devlin at the helm. This index lists all feature articles that appeared in the section, in chronological order, followed by a listing of all software reviews, ordered alphabetically by the name of the package.

## **Feature (Lead in) Articles**

*Observations on the Use of Computers in Proof Checking*, by N. Shankar, July/August 1988, p. 804

*The HP-28S Brings Computations and Theory Back Together in the Classroom*, by Yves Nievergelt, July/August 1988, p. 799

*Are Algorithms Patentable?*, by Edward N. Zalta, July/August 1988, p. 796

*Supercalculators on the PC*, by Barry Simon and Richard M. Wilson, September 1988, p. 978

*Academic Computing and Networking*, by Richard S. Palais, October 1988, p. 1140

*The CAYLEY Group Theory System*, by D. F. Holt, October 1988, p. 1135

*For the Love of Mathematics*, by Jon Barwise, November 1988, p. 1349

*Mathematica in Undergraduate Mathematics*, by Paul Zorn, November 1988, p. 1349

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*Mathematica and Me*, by J. J. Uhl, Jr., November 1988, p. 1345

*Other Comments on Mathematica*, by Doug Lind, November 1988, p. 1344

*Mathematica—a Review*, by Eugene A. Herman, November 1988, p. 1334

*Mathematics Without Theorems?* by Keith Devlin, December 1988, p. 1481

*Cyclic Random Competition: A Case History in Experimental Mathematics*, by David Griffeth, December 1988, p. 1472

*Creating Courseware*, by Jon Barwise and John Etchemendy, January 1989, p. 32

*The Barrier of Meaning*, by Gian-Carlo Rota, February 1989, p. 141

*Grinnell College's MathLAN*, by Gene Herman, March 1989, p. 243

*A New Proof of the Gödel Incompleteness Theorem*, by George Boolos, April 1989, p. 388

*Functional Programming Languages*, by Alex Feldman, May/June 1989, p. 549

*Computers in the University of Wisconsin, Madison Mathematics Department*, by Rod Smart, May/June 1989, p. 545

*Chaitin's Equation: An Extension of Gödel's Theorem*, by Jean-Paul Delahaye, October 1989, p. 984

*T<sub>E</sub>X and Typesetting—an Author's View*, by Michael Doob, November 1989, p. 1203

*T<sub>E</sub>X and Typesetting—a Publisher's View*, by Martin Gilchrist, November 1989, p. 1199

- Computers-in-Calculus: The Dearborn Project*, by David A. James, January 1990, p. 8
- Homework Assignments by Computer Mail*, by Stephen B. Maurer, February 1990, p. 128
- Computers in Mathematics at Lafayette College*, by Clifford A. Reiter and Thomas R. Yuster, February 1990, p. 124
- T<sub>E</sub>X and the Single CPU*, by Michael Doob, March 1990, p. 270
- Almost No Stuff In, Wrong Stuff Out*, by J. Douglas Child, April 1990, p. 415
- The Right Stuff*, by Keith Devlin, April 1990, p. 417
- Pedagogical Issues in the Use of Computers*, by Ed Dubinsky, May/June 1990, p. 563
- Ejournals*, by Leslie Burkholder, May/June 1990, p. 565
- Four Computer Mathematical Environments*, by Barry Simon, September 1990, p. 861
- Computer Viruses: Diagonalization and Fixed Points*, by William F. Dowling, September 1990, p. 858
- Four Word Processors with T<sub>E</sub>X Capabilities*, by J. S. Milne, October 1990, p. 1018
- Computer Algebra and Stochastic Calculus*, by Wilfrid S. Kendall, November 1990, p. 1254
- Computers and Research at Four-Year Colleges*, by Keith Devlin, November 1990, p. 1257
- Report on a Computer Information Survey*, by J. I. Hall, December 1990, p. 1363
- Symbolic Algebra Reviews in the '90s*, by Victoria Bush, December 1990, p. 1359
- Index of Reviews of Mathematical Software*, compiled by Susan E. Quinn, December 1990, p. 1357
- Guidelines for Reviews of Software*, December 1990, p. 1363
- Checking Mathematics with Computer Assistance*, by N. G. de Bruijn, January 1991, p. 8
- Mathematics and Beauty: Several Short Classroom Experiments*, by Clifford A. Pickover, March 1991, p. 190
- Will the "Real" Arithmetic Please Stand Up?*, by Peter R. Turner, April 1991, p. 298
- Is Computer Teaching Harmful?*, by P. R. Halmos, May/June 1991, p. 420
- A Perspective on Computational Number Theory*, by Robert D. Silverman, July/August 1991, p. 562
- Crimes and Misdemeanors in the Computer Algebra Trade*, by David R. Stoutemyer, September 1991, p. 778
- Symbolic vs. Numerical Computations in Mathematical Research*, by Silvio Levy, October 1991, p. 900
- Two Computer-Supported Proofs in Metric Space Topology*, by William M. Farmer and F. Javier Thayer (The MITRE Corporation) November 1991, p. 1133
- T<sub>E</sub>X and the Single CPU—Part II*, by Michael Doob, December 1991, p. 1243
- Mathematics and Computers at the AAAS*, by Keith Devlin, February 1992, p. 113
- Tales of Gods and Heroes: "The Nectar of the Gods"*, by M. C. Nucci, May/June 1992, p. 427
- The Nature of Proof?*, by Keith Devlin, November 1992, p. 1065
- Computers, Formal Proofs, and the Law Courts*, by Donald MacKenzie, November 1992, p. 1066
- Year-end Thoughts*, by Keith Devlin, December 1992, p. 1186
- Automated Reasoning Answers Open Questions*, by Larry Wos, January 1993, p. 15
- Using Programs to Teach Logic to Computer Scientists*, by Doug Goldson and Steve Reeves, February 1993, p. 143
- AMS-L<sup>A</sup>T<sub>E</sub>X*, by George Grätzer, February 1993, p. 148
- Advances in T<sub>E</sub>X Implementations; Part I: Postscript Fonts*, by George Grätzer, September 1993, p. 834
- TwoGroups: A Database for Group-Theory*, by G. Butler, S. S. Iyer, and E. A. O'Brien, September 1993, p. 839
- Geomview: An Interactive Geometry Viewer*, by Mark Phillips, Silvio Levy, and Tamara Munzner, October 1993, p. 985
- Cabri-Géomètre vs. the Geometer's Sketchpad: A Comparison of Two Dynamic Geometry Systems*, by William V. Habegger and John W. Emert, October 1993, p. 988
- The Geometry Forum*, by Gene Klotz, October 1993, p. 992
- Some Primality Testing Algorithms*, by R. G. E. Pinch, November 1993, p. 1203
- Using the math.school.edu Convention*, by Greg Kuperberg, November 1993, p. 1210
- The Death of Proof*, by Keith Devlin, December 1993, p. 1352
- Advances in T<sub>E</sub>X Implementations; Part II: Integrated Environments*, by George Grätzer, February 1994, p. 106
- Advances in T<sub>E</sub>X Implementations; Part III: A New Version of L<sup>A</sup>T<sub>E</sub>X, Finally*, by George Grätzer, July/August 1994, p. 611
- Advances in T<sub>E</sub>X; Part IV: Header and Footer Control in L<sup>A</sup>T<sub>E</sub>X*, by George Grätzer, September 1994, p. 772
- Pocket Calculating the Quartic*, by Eugene Lehman, September 1994, p. 777

*Advances in T<sub>E</sub>X Part V: Using Text Fonts in the New Standard L<sup>A</sup>T<sub>E</sub>X*, by George Grätzer, October 1994, p. 927

*A Construction for Computer Visualization of Certain Complex Curves*, by Andrew Hanson, November/December 1994, p. 1156

*Advances in T<sub>E</sub>X; Part VI: Using Math Fonts in the New Standard L<sup>A</sup>T<sub>E</sub>X* by George Grätzer, November/December 1994, p. 1164

### Software Reviews

*APL \*PLUS PC* is a programming language in matrix calculus. Reviewed by Fernando Tusell, October 1989, p. 996.

*ASP* (A Statistical Package) is a general purpose statistical package. Reviewed by Louis D. Grey, February 1992, p. 117.

*Axiom* is an open, modular system, descendant of the Scratchpad system. Reviewed by Larry Lambe, January 1994, p. 14.

*Bitmap-free T<sub>E</sub>X* (DVIWindo and DVIPSONE) concerns the Windows-based screen previewer and a printer driver for T<sub>E</sub>X. Reviewed by John L. Casti May/June 1993, p. 464.

*Calculus and the Derive Program: Experiments with the Computer*, by Lawrence G. Gilligan and James F. Marquardt. Reviewed by Alan D. Solomon, July/August 1992, p. 595.

*Calculus Calculator (CC)* is a mathematical worksheet for IBM-PCs with graphics capability. Reviewed by Herbert L. Holden, September 1989, p. 842, and again by Roger Pinkham, January 1992, p. 12.

*Calculus T/L II* is an instructional program for college-level calculus; includes a portion of *Maple*. Reviewed by Mihai Cipu, November/December 1994, p. 1165.

*Cayley* is a programming language aimed at discrete mathematics with a strong emphasis on group theory and related algebraic structures. Reviewed by D. F. Holt, October 1988, p. 1135.

*ChiWriter* is a scientific word processor. Discussed by J. S. Milne, October 1990, p. 1018. *ChiWriter* was also included in a comparative review by J. S. Milne, October 1992, p. 838.

*CMacT<sub>E</sub>X* is a recent port of UNIX C-T<sub>E</sub>X to the Macintosh. Reviewed in comparison with OzT<sub>E</sub>X (v1.42 and v1.6) and DirectT<sub>E</sub>X (v2.0) by Tom Scavo, Yannis Haralambous, and Werenfried Spit, December 1993, p. 1353.

*Computational Laboratories in Number Theory*, a suite of programs and accompanying manual to explain the text *Introduction to the Theory of Numbers*, by Ivan Niven, Herbert Zuckerman, and Hugh Montgomery, is reviewed by Susanna Fishel, July/August 1994, p. 619.

*Converge*, a package for use in teaching and learning mathematics from algebra through calculus, is reviewed by Gustaf Gripenberg in July/August 1994, p. 618.

*Cube* is a Macintosh program that simulates a Rubik's cube. Reviewed by Tevian Dray, November 1991, p. 1140.

*Data Desk* is a general purpose statistics package for the Mac, including many graphics features, data importing, multiple regression, and more. Reviewed by Roger Pinkham, February 1994, p. 113.

*DEGraph* is an equation graphing program for the Macintosh. Reviewed by David Hartz, May/June 1989, p. 559.

*Derive* is a menu-driven symbolic manipulation program. Reviewed by Eric L. Grinberg, September 1989, p. 838; and by Phil Miles, March 1990, p. 275; and again by Barry Simon, September 1990, p. 861.

*Derive (v2)*. Reviewed by Marvin Margolis, January 1992, p. 12. Two books utilizing the *Derive* program were reviewed by Alan Solomon, July/August 1992, p. 595. The first book is titled *Exploring Math from Algebra to Calculus with Derive: A Mathematical Assistant*, by Jerry Glynn; the second book is titled *Calculus and the Derive Program: Experiments with the Computer*, by L. Gilligan and J. Marquardt. *Derive* was included in a comparative CAS review by Barry Simon, September 1992, p. 700.

*DirectT<sub>E</sub>X* is a no-compromise solution to implementing T<sub>E</sub>X on the Macintosh, treating the Mac as though it were a command-line system. It is a shareware implementation, working only in the presence of Macintosh Programmer's Workshop. Reviewed in comparison with OzT<sub>E</sub>X (v1.42 and v1.6) and CMacT<sub>E</sub>X (v2.0) by Tom Scavo, Yannis Haralambous, and Werenfried Spit, December 1993, p. 1353.

*dstool* (short for Dynamical System TOOLkit) is designed to aid researchers in the investigation of dynamical systems. Reviewed by A. Back, J. Guckenheimer, M. Myers, F. Wicklin, and P. Worfolk (all from the Center for Applied Mathematics at Cornell University), April 1992, p. 303.

*Eureka* is an equation solver allowing several simultaneous equations. Reviewed by Barry Simon and Richard M. Wilson, September 1988, p. 978.

*EXP* is a scientific word processor. Discussed by J. S. Milne, October 1990, p. 1018.

*Exploring Mathematics from Algebra to Calculus with Derive*, by Jerry Glynn. Reviewed by Alan D. Solomon, July/August 1992, p. 595.

*Exploring Interior-Point Linear Programming* is an easily accessible introduction to the new class

of algorithms known as interior-point methods for linear programming (Karmarkar's algorithm). Reviewed by Louis Baker, November 1994, p. 1168.

Exploring Small Groups (ESG) is a tool for learning abstract algebra. Reviewed by Suzanne Molnar, December 1989, p. 1358.

*f(z)* is an interactive microcomputer graphics program designed to aid in the study of functions of a complex variable. Reviewed by Marvin Margolis, July/August 1989, p. 676, and by Tevian Dray, October 1992, p. 841.

*FFTLIB* is a library of FORTRAN subroutines for performing a variety of discrete Fourier transforms on IBM-PCs. Reviewed by Herb Holden, April 1990, p. 426.

*Fields & Operators* is an interactive graphics program designed to help users visualize surfaces, vector fields, and integral flows and to investigate the effects of differential operators applied to them. Reviewed by Marvin S. Margolis, October 1990, p. 1024. The Macintosh version was reviewed by Jim Northrup, January 1994, p. 22.

*FITLIB* provides the user with FORTRAN subroutine libraries in both source code and object code format for the purpose of fitting data with tension splines. Reviewed by Herb Holden, March 1989, p. 251.

*4-Dimensional Hypercube* is a simple program which displays a 2-D cross section of a 4-D hypercube. Reviewed by Tevian Dray, October 1992, p. 841.

*FOR\_C*: A FORTRAN to C Translator, by Cobalt Blue, is designed to port existing FORTRAN code into clear, readable ANSI C code, which can then be compiled on any ANSI C compiler. Reviewed by Jeffrey M. Augenbaum, March 1992, p. 189.

Frame Maker is a fully integrated text graphics and equation processing system. Reviewed by R. W. Darling, February 1993, p. 150.

*Function Finder* is intended to help students develop their own methods of finding equations to match tables of values. *Function Finder* creates a function, and the student must learn about this function by building a table of values for it. Reviewed by Jim Northrup, May/June 1991, p. 424.

*GAP* is a system for computations in discrete algebra, with particular emphasis on computational group theory. Reviewed by Edward Spitznagel, September 1994, p. 780.

Gauss is a mathematical programming language built around manipulation of mathematical objects with an interpretative and compiled mode. Reviewed by Barry Simon and Richard M. Wilson, September 1988, p. 978.

*GP/PARI* is a collection of programs for fast, in-

finite-precision arithmetic and high-precision, floating-point calculation, built with special attention for its use for number-theoretic computations. *Pari* and *GP* were reviewed by Fernando Gouvea, October 1991, p. 903. An informational follow-up to *GP/Pari*, by Fernando Gouvea, appeared in January 1993, p. 30.

*Grapher* is a Macintosh program that can be used to generate several types of graphs. *Grapher* is capable of plotting both rectangular and polar curves and is able to handle parametric equations, interpolating polynomials, systems of differential equation, direction fields and series. Reviewed by Jim Northrup, April 1992, p. 309.

*Graphical Aids for Stochastic Processes (GASP)* is a set of six computer videos on probability and stochastic processes. Reviewed by Andrew Matchett, February 1989, p. 147.

*Groups* is a program for the NeXT that can help students learn about all of the finite groups of orders up to 20. Reviewed by Suzanne M. Molnar, April 1990, p. 427.

*GyroGraphics* offers real-time interactive animation of 3-D graphs of surfaces, space curves, vector fields, tangent vectors, acceleration vectors, and tangent planes. Reviewed by Gustaf Gripenberg, February 1990, p. 109. *GyroGraphics (v4)* was reviewed by Larry Riddle, April 1993, p. 332.

Harmonic Function Theory is a collection of *Mathematica* routines, together with extensive documentation, for the manipulation of the expressions arising in the study of harmonic functions. Requires *Mathematica* 2.0 or later, running on any platform. Freeware designed to accompany the author's book *Harmonic Function Theory*. Reviewed by Paul C. Abbott, November 1993, p. 1212.

*HiQ* is a completely integrated software environment for real-world problem solving in engineering, mathematics, and the applied sciences. Reviewed by Maurino Bautista, September 1994, p. 784.

*IMAGE-Calculus* is a graphing tool for the exploration of calculus concepts. Reviewed by John Nolan, May/June 1994, p. 455.

*ISETL* (Interactive Set Language) is an interpreted, interactive implementation of the high-level computer language SETL. Reviewed by Donald Muench, March 1990, p. 276.

*jspell* is a state of the art ASCII file spellchecker especially suitable for  $\text{T}_{\text{E}}\text{X}/\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$  documents. Reviewed by Eric Schweitzer, September 1994, p. 782.

*Kaos* is a dynamical system tool kit with interactive graphics interface. Reviewed by Ian Stewart, December 1991, p. 1246.

Leo is a scientific word processor. Discussed by J. S. Milne, October 1990, p. 1018. It was included in a comparative review by J. S. Milne, October 1992, p. 838.

*LifeLab* is a public domain Macintosh program for experimenting with 2-D cellular automata. Reviewed by Andrew Trevorrow, July/August 1989, p. 680.

*Linear Algebra and Differential Equations—an Integrated Approach* is a textbook for an undergraduate course in matrix theory and differential equations by Charles G. Cullen. It is designed to accompany three software packages: *MATMAN*, *MATALG*, and *RK124*. Reviewed by William H. Ruckle, March 1992, p. 185.

*Linear Programming* is a program for use by beginners in linear programming. Reviewed by Raymond Smith, May/June 1990, p. 568.

*MacMath* is a suite of programs designed for use in a course on differential equations. It is intended to be used in conjunction with the textbook *Differential Equations: A Dynamical Systems Approach*. Reviewed by Bob Fisch, July/August 1992, p. 590.

*Macsyma* is an interactive symbolic algebra program. Reviewed by Yvonne Nagle, January 1990, p. 11; also discussed by Barry Simon, September 1990, p. 861. Part I of a comparative review (with *Maple*) by John Crow appears in March 1994, p. 195; Part II appears in April 1994, p. 299.

*Maple* is a general purpose mathematical program which includes symbolic manipulation. Discussed by Barry Simon, September 1990, p. 861. Included in a comparative CAS review by Barry Simon, September 1992, p. 700, and in another comparative review by Paul C. Abbott, October 1992, p. 829. Part I of a comparative review (with *Macsyma*) by John Crow appears in March 1994, p. 195; Part II appears in April 1994, p. 299.

*Maple V* for the Macintosh is reviewed by Ira Gessel, March 1993, p. 236.

*MATCALC* is a matrix calculation package designed for use in teaching basic linear algebra concepts as well as modern computational methods in linear and matrix algebra. Reviewed by V. S. Ramamurthi, July/August 1989, p. 678.

*MathCad*, reviewed as a “supercalculator”, is a kind of technical word processor with “live” formulas. Reviewed by Barry Simon and Richard M. Wilson, September 1988, p. 978; v2.03 reviewed by Mary Beth Ruskai, January 1990, p. 15; v3.1 reviewed by William H. Ruckle, January 1993, p. 26. *MathCad 5.0 PLUS* review appears in October 1994, p. 929, by Raj K. Markanda.

*Mathematica* is a kit of powerful mathematical tools and programming language in a uniform graphical environment. *Mathematica* is reviewed

by Eugene A. Herman, November 1988, p. 1334, and discussed in collected comments by Doug Lind, J. J. Uhl, Jr., Paul Zorn, and Jon Barwise, November 1988, p. 1345. It is also discussed by Barry Simon, September 1990, p. 861. *Mathematica 2.0* review by Sha Xin Wei appears in May/June 1992, p. 428. *Mathematica 2.0* for Windows reviewed by Fernando Gouvea, May/June 1992, p. 435. The *Mathematica* program for DOS as well as for Windows was included in a comparative CAS review by Barry Simon, September 1992, p. 700. *Mathematica* was included in another comparative review by Paul C. Abbott, October 1992, p. 829.

*Mathematica Help Stack* is a Mac hypercard stack that provides cross-reference about *Mathematica* functions and commands. Comes with *Mathematica—Quick Reference Guide* for *Mathematica* functions. Reviewed by Frank Zizza, May/June 1994, p. 459.

*Mathematical MacTutor* is an educational package including algebra, geometry, calculus, number theory, analysis, graph theory, and statistics. Reviewed by Mihai Cipu, May/June 1994, p. 458.

*MathType* is an equation editor that lets you build up complex equations, in accordance with conventions of mathematical typesetting, using point-and-click techniques. *MathType* (Mac v2.11) is reviewed by David G. Hartz, April 1991, p. 304. *MathType* for Windows is reviewed by Fernando Gouvea, November 1992, p. 1069. *MathType 3.0* is reviewed by David Hartz, May/June 1993, p. 469.

*MathView Professional* is a package of numerical routines such as algebraic systems problems, roots and zeroes, ODE, integrals, optimization, series operations, and more. Reviewed by Raymond F. Smith, April 1989, p. 393.

*Mathwriter* is a mathematical text processing program for the Macintosh. Reviewed by Thomas Scavo, July/August 1991, p. 568.

*Matlab* is a general purpose package for numeric computation available in PC and Macintosh student edition format. Reviewed by Barry Simon and Richard M. Wilson, September 1988, p. 978; and again by Joel Davis, Tevian Dray, and Andre Weideman, April 1993, p. 329.

*Matrix Algebra* is a Macintosh program for use in a linear algebra course. Reviewed by Suzanne M. Molnar, January 1993, p. 28.

*MAX: MAtRiX Algebra Calculator* is IBM-PC software consisting of linear algebra problems, enabling students to work with “real-life problems that require computer support.” Reviewed by Gustaf Gripenberg, April 1994, p. 305.

*MG—Mathematical Graphics System* is a program for creating and displaying 2- and 3-D mathe-

mathematical graphics. Reviewed by Marvin Margolis, March 1994, p. 200.

*Microcalc* is a program for learning and teaching calculus. Reviewed by Gustaf Gripenberg, July/August 1989, p. 680.

*Milo* is a symbolic math and graphing program. Reviewed by Raymond F. Smith, October 1989, p. 987; and also by Sha Xin Wei in the same issue, p. 991.

*Minitab* is a general purpose statistical package available in PC format. The student edition was reviewed by Marvin S. Margolis, March 1993, p. 238.

*MINPACK1-LIB* is a collection of FORTRAN library routines that can be used for solving nonlinear systems of equations and nonlinear least-squares problems. Reviewed by Gustaf Gripenberg, April 1989, p. 397.

*MLAB* is a DOS-based computing environment for mathematical and statistical modeling. Originally developed at the National Institute of Health in Baltimore, Maryland, for DEC systems. Widely used within the biomedical community. It is reviewed by Roger Pinkham, February 1993, p. 152.

*Models* is a package for handling differential equation, difference equations, dynamical systems, and general mathematical models. Available in both IBM-PC and Macintosh versions. Reviewed by Maurino P. Bautista, January 1992, p. 9.

*NetWare* is designed to allow IBM or IBM-compatible microcomputers to share common resources. Reviewed by Mark Sand, March 1989, p. 247.

*Numbers* is a collection of software routines for performing number-theoretic calculations that would most likely be encountered in a first course on number theory. It is reviewed by Louis D. Grey, October 1992.

*Object Logo Student Edition*, is an implementation of the programming language Logo for the Mac. It is reviewed by Suzanne M. Molnar, January 1994, p. 18.

*ODE* is a differential equation teaching program (shareware). Reviewed by Marvin Margolis, January 1992, p. 14.

*Orbits* allows the user to experiment with the nonlinear dynamical system obtained by iterating the function  $f(x) = Ax(1 - x)$ , by investigating the orbit  $-x, f(x), f(f(x)), \dots$  of a point in the unit interval  $[0, 1]$ . Reviewed by Suzanne M. Molnar, April 1990, p. 427.

*OzT<sub>E</sub>X* is a public domain Macintosh implementation of Donald Knuth's T<sub>E</sub>X typesetting system. *OzT<sub>E</sub>X* is reviewed by Andrew Trevorrow, July/August 1989, p. 680. Versions 1.42 and 1.6 are reviewed in comparison with DirectT<sub>E</sub>X and

CMacT<sub>E</sub>X (v2.0) by Tom Scavo, Yannis Haralambous, and Werenfried Spit, December 1993, p. 1353.

*Perl* was developed as a file manipulation and data reduction language for UNIX. Reviewed by Edward A. Bender and Howard Rumsey, Jr., March 1992, p. 187.

*Phase Portraits* is an equation graphing program for the Macintosh. Reviewed by David Hartz, May/June 1989, p. 559.

*Phaser* is an animator/simulator for dynamical systems that runs on IBM-PCs. Reviewed by Marvin Margolis, April 1990, p. 430.

*Plot* is a 2-D plotter for Cartesian, polar, or parametric functions used for exploration in precalculus and calculus courses. It has additional capabilities for 3-D plots, implicit graphs, and differential equations. Reviewed by Larry Riddle, November 1991, p. 1138.

*Point Five* is a line-oriented programming environment with many spreadsheet-like properties and a built-in array editor. Reviewed by Barry Simon and Richard M. Wilson, September 1988, p. 978.

*Polymath* combines scientific and engineering plotting, a programming language, an editor, and a comprehensive documentation system into an interactive calculatorlike environment. The *Polymath* programming language is a greatly expanded derivation of *Forth* that aims to fill the gap between using a programmable scientific calculator and programming in a classical computer language. Reviewed by Roger Pinkham, May/June 1991, p. 423.

*PowerMath* is a computer algebra system for the Macintosh. Reviewed by Yvonne Nagel, November 1989, p. 204. It is also discussed by Phil Miles, in the same issue, p. 1206.

*Problem Solver* is a computer program that accompanies the book *Problem Solver for Finite Mathematics and Calculus*, written by Kenneth L. Wiggins. The package is primarily intended for students of finite mathematics and applied calculus. Reviewed by Mario Vassallo, July/August 1992, p. 593.

*Prograph* is a software development/programming language for the Macintosh. It lets you build real Mac applications with windows, menus, etc., by drawing information flow graphs. Reviewed by Jon Barwise, July/August 1992, p. 587.

*PSMathGraphsII* is a program for the preparation of accurate, high-resolution color diagrams on the Macintosh. Generates PostScript language description of mathematical objects. Produces PICT, EPS, and Illustrator file types for posting to other programs. Reviewed by Suzanne M. Molnar, February 1992, p. 114. *PSMathGraphsII* v1.1

is reviewed by Tom Scavo and Larry Riddle, November 1992, p. 1075.

*Reduce* is a computer algebra system. Included in a comparative CAS review by Barry Simon, September 1992, p. 700.

*Real MaTrices: RMT* for Elementary Linear Algebra performs computations with matrices having real numbers as entries. Reviewed by Herb Holden, October 1991, p. 904.

*Rubik Algebra* enables the user to perform face rotations on a Rubik's cube and analyze them as a product of disjoint cycles. Reviewed by Mark Sand, November 1989, p. 1207. *Rubik Algebra* is also discussed by Suzanne M. Molnar, April 1990, p. 427.

*Scratchpad* is a computer algebra system and programming language. Reviewed by Larry Lambe, February 1989, p. 143.

*Scientific Programmer's Toolkit* is a collection of mathematical and graphical routines together with utility and user interface routines, creating a framework for writing programs. Reviewed by Marvin Margolis, July/August 1994, p. 615.

*Scientific Word* is a WYSIWYG front end to  $\text{\TeX}$ . Included in a comparative review by J. S. Milne, October 1992, p. 838.

*Snappea* is a tool for anyone interested in hyperbolic 3-manifolds or knot theory. Reviewed by Colin Adams, March 1990, p. 273.

*SOLVE1* consists of a number of Turbo Pascal procedures for doing vector and matrix calculations on IBM-PC and compatible computers. Reviewed by Gustaf Gripenberg, September 1990, p. 868.

*Sparsgem* is a library of FORTRAN subroutines for solving systems of equations with sparse coefficient matrices. Reviewed by Charles W. Champ, October 1990, p. 1023.

*Spreadsheets & Mathematics* is an instructional package intended for any student ready for college-level algebra. Designed to be used in a one-semester, 4-credit course. Reviewed by Mario Vassallo, April 1994, p. 303.

*StatXact* is a software package for nonparametric statistical inference. Its purpose is to provide exact conditional tests when the asymptotic theory required by standard procedures may not be valid. Reviewed by Marvin Margolis, November 1994, p. 1167.

T3 is a scientific word processor. Discussed by J. S. Milne, October 1990, p. 1018.

Tarski's World is a software tutorial written to introduce first-order predicate logic. Reviewed by Mark Seligman, November 1989, p. 1208.

*TEMATH* is an easy-to-use tool for the exploration of mathematical concepts designed for students in a wide spectrum of high school math-

ematics courses, including algebra, precalculus, calculus, and beyond. Reviewed by Larry Riddle, October 1994, p. 931.

*Tess* is a Macintosh program that simulates a 4-D Rubik's cube. Reviewed by Tevian Dray, November 1991, p. 1140.

$\text{\TeX}$  is a mathematical typesetting system. Discussed by Martin Gilchrist, November 1989, p. 119. Discussed in the same issue by Michael Doob, p. 1203.  $\text{\TeX}$  is also reviewed by Michael Doob, March 1990, p. 270.

*Theorist* is a symbolic algebra and graphing package for Macintosh. Reviewed by Fritz Smith, December 1991, p. 1253.

*TI-85* is a graphics calculator. Reviewed by Roger Pinkham, January 1993, p. 29.

*TKSolver Plus* is an equation solver that allows solution by direct substitution if possible as well as using Newton's method. Reviewed by Barry Simon and Richard M. Wilson, September 1988, p. 978.

*True BASIC* is a programming language. Reviewed by John F. Sallee, May/June 1989, p. 554.

*UBASIC* is a public domain, high-precision BASIC for IBM-PCs. Reviewed by Walter D. Neumann, May/June 1989, p. 557. *UBASIC* Version 8 is reviewed by Walter D. Neumann, March 1990, p. 196.

$\text{\VTeX}$  Typesetting Package is reviewed by John L. Casti, February 1990, p. 105.

Word is a word processing program with technical word processing capabilities. Version 4.0 is reviewed by Thomas Scavo, December 1989, p. 1353.

*X(PLORE)* is the latest version of the calculus calculator, calculating environment for developing, exploring, and testing mathematical ideas. Reviewed by Herbert Holden, March 1994, p. 200.

*Xtal* is a program designed to convey the idea of a visual-parallel programming language. Reviewed by Eric Schweitzer, February 1994, p. 111.

*ZG* is a program for data analysis, featuring a base mode that operates as a calculator and a list mode that can analyze up to four lists of numbers. Reviewed by Mark Sand, April 1989, p. 398.

