BOOK REPORTS

The Book Reports section is a regular feature of *Computers & Mathematics with Applications.* It is an unconventional section. The Editors decided to break with the longstanding custom of publishing either lengthy and discursive reviews of a few books, or just a brief listing of titles. Instead, we decided to publish every important material detail concerning those books submitted to us by publishers, which we judge to be of potential interest to our readers. Hence, breaking with custom, we also publish a complete table of contents for each such book, but no review of it as such. We welcome our readers' comments concerning this enterprise. Publishers should submit books intended for review to the Editor-in-Chief,

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The Unified Computation Laboratory , Modelling, Specifications and Tools. Edited by Charles Tattray and Robert G. Clark. Oxford University Press, New York, NY. (1992). 461 pages. $98.00.
Contents:
I. Modelling and specification. 1. Some mathematical thoughts on languages for data directed design. 2. Algebraic alternative for compiler construction. 3. Algebraic semantics and monad theory. 4. An illustrated mathematical foundation for ERA. 5. On the expressiveness of equational type logic. 6. Linear term rewriting systems are higher dimensional string rewriting systems. 7. Inductive reasoning for completing equational software specifications. 8. Term induction proofs by a generalization of narrowing. II. Formal methods in software development. 9. Prototyping and formal specifications. 10. Development of modular specifications by stepwise refinements using the PLUSS specification language. 11. Software complexity measures, programming methodologies, and the size of machines. 12. The implementation of Z specifications using program transformation systems: The SuZan project. 13. The systematic reduction of VDM specifications. 14. Experiences with using formal specification techniques for operations research problems. 15. A survey of temporal logic methods in system development. III. Specification for communication and concurrency. 16. Integrating automata and temporal logic: A framework for specification of real-time systems and software. 17. Specification and derivation of process networks. 18. Algebraic term nets: A formalism for specifying communication software in the OSI framework. 19. Using LOTOS in the object-based development of embedded systems. 20. A data type specification for the process part of basic LOTOS—An axiomatic semantics. 21. Modelling of LOTOS specifications by Petri nets. IV. Program verification and development. 22. Modules and verification. 23. Program analysis by symbolic execution and generalization. 24. Proving and developing concurrent programs—a small system. 25. Automated proof and program development. 26. Interactive automated verification of functional programming languages. 27. Theorem proving and program synthesis with Oyster. 28. The PICT system. 29. An interactive tool for deriving correct programs.

Basic Statistical Computing, Second Edition. By D. Cooke, A. H. Craven and G. M. Clarke. Hodder & Stoughton, London. (1990). 178 pages. £13·99.
Contents:
1. Introduction. 2. Some general principles. 3. Sorting and ranking. 4. Inspection and summary of data using tables. 5. Inspection and summary of data using graphical methods. 6. Computation of variance and correlation coefficients. 7. Simulation. 8. Probability functions of random variables. 9. Generation of random samples from non-uniform distributions. 10. Significance tests and confidence intervals. 11. Regression. 12. Analysis of variance. Appendices. A. Using the algorithms in this book. B. Solving a set of linear equations. C. Student data set.

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3D Model Recognition from Stereoscopic Cues. Edited by John E. W. Mayhew and John P. Frisby. MIT Press, Cambridge, MA. (1991). 269 pages. $50.00.
Contents:

I. Grant proposal. II. PMF stereo algorithm project. 1. PMF: A stereo correspondence algorithm using a disparity gradient limit. 2. Disparity gradient, Lipschitz continuity and computing binocular correspondences. 3. Implementation details of the PMF stereo algorithm. 4. Binocular stereo algorithm based on the disparity-gradient limit and using optimization theory. 5. The role of disparity gradient in stereo vision. 6. Estimation of stereo and motion parameters using a variational principle. 7. On the reconstruction of a scene from two unregistered images. 8. A pipelined architecture for the Canny edge detector. 9. Parallel architectures for fast 3D machine vision. 10. A multiprocessor 3D vision system for pick and place. III. 2.5D sketch project. 11. Segmentation and description of binocularly viewed contours. 12. Optimal combination of multiple sensors including stereo vision. 13. Viewpoint-invariant reconstruction of visible surface. 14. Invariant surface reconstructions using weak continuity constraints. 15. Comparison of the efficiency of deterministic and stochastic algorithms for visual reconstruction. 16. Weak continuity constraints generate uniform scale-space descriptions of plane curves. 17. Detecting specular reflections using Lambertian constraints. 18. Geometry from specularities. 19. Consistency maintenance in the REVgraph environment. 20. Location and description of textured surfaces using stereo vision. IV. 3D model-based vision project. 21. Advances in 3D model identification from stereo data. 22. Dupin's cyclide and the cyclide patch. 23. Geometric reasoning in a parallel network. 24. SMS: A suggestive modelling system for object recognition. 25. WPFM: The workspace prediction and fast matching system. 26. The design of the IMAGINE II scene analysis program. 27. In search of 'characteristic view' 3D object representations in human vision using ratings of perceived differences between views. 28. Matching geometrical descriptions in three-space. 29. TINA: A 3D vision system for pick and place. 30. Double and triple ambiguities in the interpretation of two views of a scene.

Lectures on the Coupling Method. By Torgny Lindvall. John Wiley & Sons, New York. (1992). 257 pages. $49.95.
Contents:

I. Preliminaries. II. Discrete theory. 1. Renewal theory. 2. Markov chains. 3. Random walk. 4. Card shuffling. 5. Poisson approximation. III. Continuous theory. 1. Renewal theory. 2. Harris chains. 3. Maximal coupling. 4. Regenerative processes. 5. On Markov processes. IV. Inequalities. 1. Strassen's theorem. 2. Domination. 3. Domination and monotonicity of Markov processes. 4. Examples of domination. V. Intensity-governed processes. 1. Birth and death processes. 2. General birth and death processes. 3. Interacting particle systems. 4. Embedding in Poisson processes. 5. More renewal theory. 6. On a class of point processes. VI. Diffusions. 1. One-dimensional processes. 2. Multidimensional processes. Appendices. 1. Polish spaces. 2. Epilogue.

Artificial Intelligence Applications in Manufacturing. Edited by A. (Fazel) Famili, Dana S. Nau and Steven H. Kim. MIT Press, Cambridge, MA and London, England. (1992). 455 pages. $39.95.
Contents:

I. Design and planning. 1. Application of machine learning to industrial planning and decision making. 2. Incorporating special purpose resource design in planning to make more efficient plans. 3. Geometric reasoning using a feature algebra. 4. Backward assembly planning. 5. Symmetry groups in solid model-based assembly planning. 6. An expert system approach for economic evaluation of machining operation planning. II. Scheduling and control. 7. Interactive problem solving for production planning. 8. An abstraction-based search and learning approach for effective scheduling. 9. ADDYMS: Architecture for distributed dynamic manufacturing scheduling. 10. An architecture for real time distributed scheduling. 11. Teamwork among intelligent agents: Framework and case study in robotic service. 12. Exploiting local flexibility during execution of pre-computed schedules. III. Manufacturing integration. 13. Symbolic representation and planning for robot control systems in manufacturing. 14. An architecture for integrating enterprise automation. 15. An intelligent agent framework for enterprise integration. 16. Integrated software system for intelligent manufacturing. 17. Enterprise management network architecture: A tool for manufacturing enterprise integration. 18. Design and manufacturing: Integration through quality.

Engineering and the Mind's Eye. By Eugene S. Ferguson. MIT Press, Cambridge, MA and London, England. (1992). 241 pages. $24.95.
Contents:

1. The nature of engineering design. 2. The mind's eye. 3. Origins of modern engineering. 4. The tools of visualization. 5. The development of and dissemination of engineering knowledge. 6. The making of an engineer. 7. The gap between promise and performance.

Using Matlab to Analyze and Design Control Systems. By Neomi Ehrich Leonard and William S. Levine. Benjamin/Cummings Publishing Company, Redwood City, CA. (1992). 134 pages. $12.95.
Contents:

1. Introduction. 2. Matlab fundamentals. 3. Plotting. 4. Setting up control problems. 5. Poles, zeros and time response. 6. Root locus plots. 7. Frequency-domain plots. 8. State-space computations. 9. Discrete-time control systems.

Innovative Applications of Artificial Intelligence 4. Edited by A. Carlisle Scott and Philip Klahr. MIT Press, Cambridge, MA. (1992). 336 pages. $30.00.
Contents:

I. Customer service applications. 1. Smart: Support management automated reasoning technology for compaq customer service. 2. A knowledge-based system within a cooperative processing environment. 3. Help desk: Using AI to improve customer service. II. Data analysis. 4. Making sense of gigabytes: A system for knowledge-based market analysis. 5. TPF dump analyzer. 6. Marvel: A distributed real-time monitoring and analysis application. III. Finance applications. 7. Pharos—The single European market adviser. 8. The credit assistant: The second leg in the knowledge highway for American Express. 9. MOCCA: A set of instruments to support mortgage credit granting. 10. Cresus: An integrated expert system for cash management. IV. Industrial applications. 11. DMCM: A knowledge-based cost-estimation tool. 12. SlurryMinder: A rational oil well completion design module. 13. An application of model-based reasoning in experiment design. V. Regulatory applications. 14. A truly magic solution. 15. Adjudipro. VI. Routing applications. 16. Hub siaashing: A knowledge-based system for severe, temporary airline schedule reduction. 17. Arachne: Weaving the telephone network at NYNEX. VII. Software development. 18. Knowledge-based code inspection with ICICLE. 19. Automatic programming for sequence control.

Logic Primer. By Colin Allen and Michael Hand. MIT Press, Cambridge, MA and London, England. (1992). 171 pages. $12.95.
Contents:

I. Sentential logic. 1. Basic logical notions. 2. A formal language for sentential logic. 3. Translation of English to sentential Wffs. 4. Primitive rules of proof. 5. Sequents and derived rules. 6. Theorems. II. Truth tables. 1. Truth tables for sentences. 2. Truth tables for sequents. 3. Tautologies. 4. Indirect truth tables. 5. English counterexamples. III. Predicate logic. 1. A formal language for predicate logic. 2. Translation of English to quantified Wffs. 3. Primitive rules of proof. 4. Sequents, theorems, and derived rules of proof. IV. Models. 1. Finite interpretations and expansions with one-place predicates. 2. Finite countermodels for arguments with one-place predicates. 3. Finite countermodels for arguments with many-place predicates. 4. Infinite countermodels.

Indefinites. By Molly Diesing. MIT Press, Cambridge, MA and London, England. (1992). 175 pages. $17.95.
Contents:

I. Deriving logical representations: A proposal. 1. Introduction. 2. The syntactic roots of indefinite interpretations. 3. Semantic partition and the interpretation of indefinites. 4. Syntactic factors in the semantics of NPs: A preview. II. Initial evidence in favor of the mapping hypothesis. 1. Introduction. 2. The readings of bare plurals. 3. The syntactic connection: Deriving the two readings. 4. Two subject positions in Germans: An IP/VP contrast. 5. Delineating the limits of the predicate classification. 6. Focus and the bare plural readings. 7. Conclusion. III. Tree splitting and the interpretation of indefinites. 1. Introduction. 2. Tree splitting and quantification. 3. QR, presuppositions and the mapping hypothesis. 4. Dutch subjects, Turkish objects and specificity. 5. Some final remarks on the nature of specificity. 6. Conclusion. IV. Presupposition, extraction and logical form. 1. Introduction. 2. A taxonomy of indefinites. 3. Extraction from NP: Some initial observations. 4. Quantification and extraction from NP. 5. Formulating the extraction constraint. 6. Concluding remarks.

Geometric Invariance in Computer Vision. Edited by Joseph L. Mundy and Andrew Zisserman. MIT Press, Cambridge, MA. (1992). 540 pages. $50.00.
Contents:

1. Introduction—Towards a new framework for vision. I. Foundations. IA. Algebraic invariants. 2. Invariant theory and enumerative combinatorics of young tableaux. 3. Geometric interpretation of joint conic invariants. 4. An experimental evaluation of projective invariants. 5. The projection of two non-coplanar conics. 6. The non-existence of general-case view-invariants. IB. Invariants of non-algebraic curves. 7. Noise resistant invariants of curves. 8. Semi-differential invariants. 9. Projective invariants for curves in two and three dimensions. 10. Numerical evaluation of differential and semi-differential invariants. 11. Recognizing general curved objects efficiently. 12. Fitting affine invariant conics to curves. 13. Projectively invariant decomposition of planar shapes. IC. Invariants from multiple views. 14. Invariant linear methods in photogrammetry and model-matching. 15. Semi-differential invariants for nonplanar curves. 16. Disambiguating stereo matches with spatio-temporal surfaces. II. Applications. 17. Transformation invariant indexing. 18. Affine invariants for model-based recognition. 19. Object recognition based on moment (or algebraic) invariants. 20. Fast recognition using algebraic invariants. 21. Toward 3D curved object recognition from image contours. 22. Relative positioning with uncalibrated cameras. III. Appendix. 23. Appendix—Project geometry for machine vision.

Surface Topology. By F. A. Firby and C. F. Gardiner. Ellis Horwood Limited, Chichester, England. (1991). 220 pages. $32.50.
Contents:

1. Intuitive ideas. 2. Plane models of surfaces. 3. Surfaces as plane diagrams. 4. Distinguishing surfaces. 5. Patterns on surfaces. 6. Maps and graphs. 7. Vector fields on surfaces. 8. Plane tessellation representations of compact surfaces. 9. Some applications of tessellation representations. 10. Introducing the fundamental group.

Pattern Recognition—Statistical, Structural and Neural Approaches. By Robert Schalkoff. John Wiley & Sons, New York. (1992). 364 pages. $69.95.

Contents:

I. Introduction and general pattern recognition concerns. 1. Pattern recognition (PR) overview. II. Statistical pattern recognition (StatPR). 2. Introduction to statistical pattern recognition. 3. Supervised learning (training) using parametric and nonparametric approaches. 4. Linear discriminant functions and the discrete and binary feature cases. 5. Unsupervised learning and clustering. III. Syntactic pattern recognition (SyntPR). 6. Overview. 7. Syntactic recognition via parsing and other grammars. 8. Graphical approaches to SyntPR. 9. Learning via grammatical inference. IV. Neural pattern recognition (NeurPR). 10. Introduction to neural networks. 11. Introduction to neural pattern associators and matrix approaches. 12. Feedforward networks and training by backpropagation. 13. Content addressable memory approaches and unsupervised learning in NeurPR. Appendices. 1. Linear algebra review. 2. Probability and random variables/vectors. 3. Discrete mathematics review. 4. Descent procedures: Examples and error function contours. 5. Similarity measures, matching techniques, and scale-space approaches. 6. Geometry for classification and state-space visualization.

Constraint-Based Grammar Formalisms. By Stuart M. Shieber. MIT Press, Cambridge, MA. (1992). 183 pages. $24.95.

Contents:

I. Introduction. II. Constraint logics for linguistic information. 1. The structure of grammatical information. 2. The PATR formalism. 3. Idealizations of the constraint-based view. 4. Constraint-based computer language description. 5. History of constraint-based formalisms. 6. The structure of constraint-based formalisms. 7. Appropriate logics for constraint-based formalisms. 8. Properties of appropriate constraint-logic models. 9. Operations on models. 10. Existence of appropriate models of $\mathcal{L}_{L,C}$. III. Grammars and parsing. 1. Defining constraint-based formalisms. 2. Grammar interpretation. 3. The abstract parsing algorithm. 4. Auxiliary notions for item semantics. 5. A correctness proof for the algorithm. 6. Instances of the abstract algorithm. IV. A compendium of model classes. 1. Finite-tree models. 2. Infinite-tree models. 3. Eqtree models. 4. Graph models. V. Parsing as type inference. 1. Natural and computer languages. 2. A difference in semantics. 3. Constraint-based computer-language formalisms. 4. Extending $\mathcal{L}_{L,C}$ with subsumption constraints. 5. Models for $\mathcal{L}_{L,C}^{\leq}$. VI. Conclusion. Appendix: Proof of properties of $\mathcal{L}_{L,C}$.

Shared Memory Multiprocessing. Edited by Norihisa Suzuki. MIT Press, Cambridge, MA. (1992). 510 pages. $50.00.

Contents:

I. Experience. 1. Experience with the Firefly multiprocessor workstation. 2. Design and evaluation of snoop-cache-based multiprocessor, TOP-1. 3. Symbolic computation algorithms on shared memory multiprocessors. 4. Experimental evaluation of algorithmic performance on two shared memory multiprocessors. II. Cache coherency. 5. Formal verification of the gigamax cache consistency protocol. 6. An evaluation of cache coherence protocols for multiprocessors. 7. KRPP: The Kyushu University reconfigurable parallel processor: Cache architecture and cache coherence schemes. III. Software system. 8. Mustard: A multiprocessor UNIX for embedded real-time systems. 9. An empirical investigation of the effectiveness and limitations of automatic parallelization. 10. Fine-grain loop scheduling for MIMD machines. 11. Restructuring a parallel simulator to improve cache behavior. 12. A replay mechanism for mostly functional parallel programs. 13. Abstracting data-representation and partitioning-scheduling in parallel programs. IV. Scalable shared memory multiprocessor. 14. Latency tolerance through multithreading in large-scale multiprocessors. 15. Cenju: A multiprocessor system with a distributed shared memory scheme for modular circuit simulation. 16. Overview and status of the Stanford DASH multiprocessor. 17. An analysis of shared-memory synchronization mechanisms. 18. A cache coherence mechanism for scalable cache coherence directories. 19. Dynamic pointer allocation for scalable cache coherence directories. 20. Fault-tolerant design for multistage routing networks.

Redundant Disk Arrays—Reliable, Parallel Secondary Storage. By Garth A. Gibson. MIT Press, Cambridge, MA. (1992). 288 pages. $35.00.

Contents:

I. Introduction. II. The importance of input/output. 1. Revisiting an old problem. 2. Rapidly growing processor performance. 3. New secondary storage technologies. 4. Replacing disks with DRAM: How soon? 5. Summary. III. Redundant disk arrays. 1. The emergence of disk arrays. 2. Disk arrays as a threat to data reliability. 3. Encoding data for on-line redundancy. 4. Performance of redundant disk arrays. 5. Summary. IV. Characterizing disk lifetimes. 1. Characterizing catastrophic disk failures. 2. In search of data on lifetime distributions. 3. Improving disk mean lifetimes. 4. A sample of lifetime data. 5. Summary. V. Reliability modeling. 1. Reliability metric. 2. Related work. 3. Tools and methods. 4. Independent disk failures. 5. Dependent disk failures. 6. Independent disk failures with on-line spares. 7. Dependent disk failures with on-line spares. 8. Summary and conclusions. VI. Conclusions. Appendices. A. Reliability simulation. B. Effect on reliability of error in MTTDL. C. Goodness-of-fit testing. D. Comparison data for Chapter 5.

Dynamic, Genetic, and Chaotic Programming. By Branko Souček and the IRIS group. John Wiley & Sons, New York. (1992). 568 pages. $74.95.
Contents:

I. Dynamic neural networks versus automated knowledge acquisition. 1. Paradigm/problem matching. 2. Dynamic systems control via associative reinforcement learning. 3. Knowledge acquisition for dynamic system control. 4. Analysis of recurrent back propogation and its application to language acquisition. 5. Recognition and restoration of periodic patterns with time-dependent recurrent neural network. 6. Adaptive stack filtering by LMS and perception learning. 7. Automatic modeling of acoustic emission phenomena by neural networks. 8. Managing the traffic of a satellite communication network by neural network. II. Genetic algorithm and genetic programming. 9. An introduction to adaptive optimization algorithms based on principles of natural evolution. 10. The genetic programming paradigm: Genetically breeding populations of computer programs to solve problems. 11. Genetic programs in robotics. 12. Efficient multiprocessor scheduling based on genetic algorithms. 13. A genetic algorithm for point pattern matching. 14. Artificial embryology: The genetic programming of an artificial embryo. 15. Structure evolution in neural systems. 16. Evolution strategies for circuit partitioning. III. The software of chaos with applications. 17. Continuous chaos and logical chaos. 18. Prediction of chaotic dynamical phenomena by a neural network. 19. Dynamic versus genetic version chaotic programming. 20. Parallel scheduling of random and of chaotic processes.

A Century of Calculus, Part I, 1894–1968. By Tom M. Apostol, Hubert E. Chrestenson, C. Stanley Ogilvy, Donald E. Richmond and N. James Schoonmaker. (1992). 462 pages. $36.00.
Contents:

1. History. 2. Pedagogy. 3. Functions. 4. Continuity, ϵ and δ discontinuities. 5. Differentiation. 6. Mean value theorem for derivatives, indeterminate forms. 7. Polynomials and polynomial approximations. 8. Maxima and minima. 9. Integration. 10. Numerical, graphical, and mechanical methods and approximation. 11. Infinite series and sequences. 12. Special numbers.

A Century of Calculus, Part II, 1969–1991. By Tom M. Apostol, Dale H. Mugler, David R. Scott, Andrew Sterrett, Jr. and Ann E. Watkins. (1992). 481 pages. $36.00.
Contents:

1. History. 2. Pedagogy. 3. Functions. a. Concepts. b. Trigonometric functions. c. Logarithmic functions. d. Exponential and hyperbolic functions. 4. Limits and continuity. 5. Differentiation. a. Theory. b. Applications to geometry. c. Applications to mechanics. d. Differential equations. 6. Mean value theorem for derivatives, indeterminate forms. a. Mean value theorem. b. Indeterminate forms. 7. Taylor polynomials, Bernoulli polynomials and sums of powers of integers. a. Taylor polynomials. b. Bernoulli polynomials and sums of powers of integers. 8. Maxima and minima. 9. Integration. a. Theory. b. Techniques of integration. c. Special integrals. d. Applications. e. Multiple integrals and line integrals. 10. Numerical, graphical, and mechanical methods and approximations (including use of computers). 11. Infinite sequences and series. a. Theory. b. Series related to the harmonic series. 12. Special numbers. 13. The light touch.

Vision. By Pierre Buser and Michel Imbert. MIT Press, Cambridge, MA. (1992). 559 pages. $45.00.
Contents:

I. Structure and organization of the retina. 1. Introduction. 2. Generalization organization. 3. Receptors and the pigment epithelium. 4. Topographic differences in receptor distributions. 5. Distribution of optic nerve fibers, visual fields, and binocular vision: Phylogenetic aspects. 6. Intermediate cellular layers. 7. Ganglion cell layer. 8. Glial cells. 9. Efferent nerve fibers. II. The physical characteristics of visual stimula. 1. Radiant energy: The fundamental radiometric units. 2. Light energy: Fundamental photometric units. 3. Colorimetric units and quantities. III. The psychophysical laws of visual sensation. 1. Problems concerned with absolute thresholds. 2. Adaptation in the retina. 3. Simultaneous contrast, visual acuity, and spatial frequency resolution. 4. Temporal effects: Temporal resolution. 5. Movement perception. 6. Real color vision. 7. Afterimages. 8. Visual space. IV. Genesis and elaboration of signals in the retina. 1. Retinal photochemistry. 2. The electroretinogram. 3. The operation of retinal receptors. 4. The neuronal network in the retina. 5. Coding of the spatiotemporal characteristics of light stimuli. V. Mechanisms in the central visual pathways. 1. The midbrain visual centers. 2. The lateral geniculate body. 3. The visual areas of the cortex. 4. The developing visual system. Appendix. Abridged classification of primates.

Rational Curves and Surfaces. By J. C. Fiorot and P. Jeannin. John Wiley & Sons, West Sussex, England. (1992). 316 pages. $34.95.
Contents:

1. General framework. 2. Rational curves: Determination from a massic polygon. 3. Algorithms. 4. Local study: Construction of a BR-curve. 5. Conics as BR-curves. 6. Rational surfaces: Determination from a massic net. 7. Parameter change in the case of a surface. 8. Affine and projective transforms of an SBR-surface. 9. Generation of SBR-surface using BR-curves. 10. Massic nets of quadrics as SBR-surfaces defined on $[0,1]^2$. 11. Algorithms for computing on SBR-surface. Appendices: BASIC and PASCAL programs.

Genetic Programming—On the Programming of Computers by Means of Natural Selection. By John R. Koza. MIT Press, Cambridge, MA. (1992). 680 pages. $55.00. Also available: Genetic Programming—The Movie. By John R. Koza and James P. Rice. PAL, $44.95; SECAM, $44.95; VHS/NTSC, $34.95.
Contents:

1. Introduction and overview. 2. Pervasiveness of the problem of program induction. 3. Introduction to genetic algorithms. 4. The representation problem for genetic algorithms. 5. Overview of genetic programming. 6. Detailed description of genetic programming. 7. Four introductory examples of genetic programming. 8. Amount of processing required to solve a problem. 9. Nonrandomness of genetic programming. 10. Symbolic regression—Error driven evolution. 11. Control—Cost driven evolution. 12. Evolution of emergent behavior. 13. Evolution of subsumption. 14. Entropy-driven evolution. 15. Evolution of strategy. 16. Co-evolution. 17. Evolution of classification. 18. Iteration, recursion, and setting. 19. Evolution of constrained syntactic structures. 20. Evolution of building blocks. 21. Evolution of hierarchies of building blocks. 22. Parallelization of genetic programming. 23. Ruggedness of genetic programming. 24. Extraneous variables and functions. 25. Operational issues. 26. Review of genetic programming. 27. Comparison with other paradigms. 28. Spontaneous emergence of self-replicating and evolutionarily self-improving computer programs. Appendices. A. Computer implementation. B. Problem-specific part of simple LISP code. C. Kernel of the simple LISP code. D. Embellishments to the simple LISP code. E. Streamlined version of EVAL. F. Editor for simplifying S-expressions. G. Testing the simple LISP code. H. Time-saving techniques. I. List of special symbols. J. List of special functions.

Parallel Computational Fluid Dynamics—Implementations and Results. Edited by Horst D. Simon. MIT Press, Cambridge, MA. (1992). 345 pages. $45.00.
Contents:

I. Overview 1. Parallel CFD: Current status and future requirements. II. Implementations on parallel machines. 2. A parallel algorithm for compressible flows through rotor-stator combinations. 3. On a massively parallel Euler solver for unstructured grids. 4. A fast scheme to analyze 3D disk airflow on a parallel computer. 5. A uniform algorithm for boundary and interior regions. 6. Implicit CFD applications on message passing multiprocessor systems. 7. Block implicit multigrid solution of the Euler equations. III. Numerical algorithms for parallel CFD. 8. A 3D ADI algorithm on distributed memory multiprocessors. 9. Clustered element-by-element computations for fluid flow. 10. Hypercube FFT and Fourier pseudospectral method. 11. An investigation of parallel iterative algorithms for CFD. IV. Performance evaluation and computer science issues. 12. Sorting for particle flow simulation on the connection machine. 13. Fluid dynamics using interface methods on parallel processors. 14. Computational performance of CFD codes on the connection machine. 15. A large grain mapping method. 16. Towards the Teraflops capability for CFD.

Global Optimization using Interval Analysis. By Eldon Hansen. Marcel Dekker, Inc., New York. (1992). 230 pages. $110.00.
Contents:

1. Introduction. 2. Interval numbers and interval arithmetic. 3. Functions of intervals. 4. Interval linear equations. 5. Interval linear inequalities. 6. Taylor series and similar expansions. 7. Nonlinear equations of one variable. 8. Systems of nonlinear equations. 9. Unconstrained optimization. 10. Constrained optimization. 11. Inequality-constrained optimization. 12. Equality-constrained optimization. 13. Perturbed problems and sensitivity analysis. 14. Miscellany.

Computer Analysis of Structural Frameworks. By James A. D. Balfour. Oxford University Press, New York. (1992). 490 pages. $65.00.
Contents:

1. Introduction. 2. Fundamentals of structural behaviour. 3. Introduction to the stiffness method. 4. Simultaneous linear equations. 5. Plane trusses. 6. Space trusses. 7. Plane frames. 8. Plane frames—Further topics. 9. Grillages. 10. SpaceFrames. 11. Structural dynamics. 12. Buying and using commercial frame analysis programs. Appendices. A. Definition of program variables. B. Summary of key formulae and matrices.

Introduction to Coding Theory. By J. H. van Lint. Springer-Verlag, New York. (1992). 183 pages. $44.50.
Contents:

1. Mathematical background. 2. Shannon's theorem. 3. Linear codes. 4. Some good codes. 5. Bounds on codes. 6. Cyclic codes. 7. Perfect codes and uniformly packed codes. 8. Goppa codes. 9. Asymptotically good algebraic codes. 10. Arithmetic codes. 11. Convolutional codes.

Telerobotics, Automation and Human Supervisory Control. By Thomas B. Sheridan. MIT Press, Cambridge, MA. (1992). 393 pages. $39.95.
Contents:

1. Theory and models of supervisory control: Frameworks and fragments. 2. Supervisory control of anthromorphic teleoperators for space, undersea, and other applications. 3. Supervisory control in transportation, process, and other automated systems. 4. Social implications of telerobotics, automation and supervisory control.

Numerical Methods for Large Eigenvalue Problems. By Youcef Saad. Manchester University Press, Manchester, UK. (1992). 346 pages. $64.95.
Contents:

1. Background in matrix theory and linear algebra. 2. Sparse matrices. 3. Perturbation theory and error analysis. 4. The tools of spectral approximation. 5. Subspace iteration. 6. Krylov subspace methods. 7. Acceleration techniques and hybrid methods. 8. Preconditioning techniques. 9. Non-standard eigenvalue problems. 10. Origins of matrix eigenvalue problems.

Theory of CMOS Digital Circuits and Circuit Failures. By Masakazu Shoji. Princeton University Press, Princeton, NJ. (1992). 570 pages. $49.50 (U.S.), £37·50 (Foreign).
Contents:

1. Physics of CMOS integrated circuits. 2. Method of analysis of CMOS circuit failures. 3. Circuit failures due to anomalous signal flow. 4. Noise phenomena in digital circuits. 5. Circuit failures due to timing problems. 6. Essential uncertainty in CMOS circuits. 7. Design failures of CMOS systems.

Fractals for the Classroom, Part Two, Complex Systems and Mandelbrot Set. By Heinz-Otto Peitgen, Hartmut Jürgens and Dietmar Saupe. Springer-Verlag, Heidelberg. (1992). 500 pages. DM 54,00.
Contents:

8. Recursive structures: Growing of fractals and plants. 9. Pascal's triangle: Cellular automata and attractors. 10. Deterministic chaos: Sensitivity, mixing and periodic points. 11. Order and chaos: Period-doubling and its chaotic mirror. 12. Strange attractors: The locus of chaos. 13. Julia sets: Fractal basin boundaries. 14. The Mandelbrot set: Ordering the Julia sets.

The Music Machine, Selected Readings from Computer Music Journal. Edited by Curtis Roads. MIT Press, Cambridge, MA. (1992). 725 pages. $24.95.
Contents:

1. Interviews. 2. Composition. 3. The MIDI interface. 4. Music software. 5. Synthesis and signal processing. 6. Signal processing hardware.

Beyond Modularity, A Developmental Perspective on Cognitive Science. By Annette Karmiloff-Smith. MIT Press, Cambridge, MA. (1992). 234 pages. $34.95.
Contents:

1. Taking development seriously. 2. The child as a linguist. 3. The child as a physicist. 4. The child as a mathematician. 5. The child as a psychologist. 6. The child as a notator. 7. Nativism, domain specificity, and Piaget's constructivism. 8. Modeling development: Representational redescription and connectionism. 9. Concluding speculations.

Differential Equations Laboratory Workbook. By Robert L. Borrelli, Courtney Coleman and William E. Boyce. John Wiley & Sons, New York. (1992). 338 pages. $16.50.
Contents:

1. Introduction: Learning about your hardware/software. 2. Solution curves and numerical methods. 3. First order equations. 4. Second order equations. 5. Planar systems. 6. Higher dimensional systems. Appendices. A. Team laboratory reports. B. Mathematical modeling. C. The atlas.

Contemporary Design Theory. Edited by Jeffrey H. Dinitz and Douglas R. Stinson. John Wiley & Sons, New York. (1992). 639 pages. $79.95.
Contents:

1. A brief introduction to design theory. 2. Orthogonal factorizations of graphs. 3. Conjugate-orthogonal Latin squares and related structures. 4. Directed and Mendelsohn triple systems. 5. Room squares and related designs. 6. Steiner quadruple systems. 7. Difference sets. 8. Decomposition into cycles II: Cycle systems. 9. Coverings and packings. 10. Colorings of block designs. 11. Hadamard matrices, sequences and block designs. 12. Large sets of disjoint designs and related structures. 13. One-factorization of complete graphs.

Fuzzy, Holographic, and Parallel Intelligence. By Branko Souček and the IRIS Group. John Wiley & Sons, New York. (1992). 350 pages. $54.95.
Contents:

I. Holographic, fuzzy, and parallel systems. 1. Processing and reasoning by association. 2. The holographic neural method. 3. Fuzzy reasoning in planning, decision making, and control: Intelligent robots, vision, natural language. 4. A fuzzy cognitive structure: Foundations, applications and VLSI implementation. 5. Intelligent systems by means of associative processing. 6. Cellular processing. II. Parallel algorithms. 7. An optimal partitioning method for parallel algorithms: LSGP. 8. Parallel matrix algorithms. 9. Parallel matrix iterative algorithms.

What Computers Still Can't Do. By Hubert L. Dreyfus. MIT Press, Cambridge, MA. (1992). 354 pages. $13.95.
Contents:
     I. Ten years of research in artificial intelligence (1957–1967). 1. Phase I (1957–1962) Cognitive simulation. 2. Phase II (1962–1967) Semantic information processing. II. Assumptions underlying persistent optimism. 3. The biological assumption. 4. The psychological assumption. 5. The epistemological assumption. 6. The ontological assumption. III. Alternatives to the traditional assumptions. 7. The role of the body in intelligent behavior. 8. The situation: Orderly behavior without recourse to rules. 9. The situation as a function of human needs. Conclusion: The scope and limits of artificial reason.

Logic Programming—Proceedings of the Joint International Conference and Symposium on Logic Programming. Edited by Krzysztof Apt. MIT Press, Cambridge, MA. (1992). 848 pages. $75.00.
Contents:
     1. Invited talks. 2. Advanced tutorials. 3. Unification. 4. Programming language issues. 5. Verification I. 6. Functions and equations. 7. Constraints. 8. Deductive databases. 9. Verification II. 10. Implementation I. 11. Negation I. 12. Concurrent logic programming. 13. Meta and higher-order programming. 14. Negation II. 15. Linear logic. 16. Implementation I. 17. Abduction. 18. Implementation of parallelism. 19. Program analysis. 20. Semantics. Addendum: The logic of architecture: Programming the invention of physical artifacts.

America's Struggle for Leadership in Technology. By Jean-Claude Derian. MIT Press, Cambridge, MA. (1992). 309 pages. $13.95.
Contents:
     1. The new frontier. 2. For a few million dollars. 3. Under the wing of the Pentagon. 4. Two cultures. 5. Technology and politics. 6. The mirage. 7. A technological challenge. 8. Questions for the information society. 9. Japan, Europe, and the two cultures. 10. Irrestible domination. 11. Made in USA. 12. A new challenge for Europe. 13. Conclusion.

Dynamic Biological Networks—The Stomatogastric Nervous System. Edited by Ronald M. Harris-Warrick, Eve Marder, Allen I. Selverston and Maurice Moulins. MIT Press, Cambridge, MA. (1992). 328 pages. $65.00.
Contents:
     1. Overview of the stomatogastric nervous system. 2. Cellular and synaptic properties in the crustacean sto-matogastric nervous system. 3. Neuromodulation of stomatogastric networks by identified neurons and trans-mitters. 4. Interactions and combinations between different networks in the stomatogastric nervous system. 5. Modeling the stomatogastric nervous system. 6. Behavioral correlates of stomatogastric network function. 7. Comparative and evolutionary aspects of the crustacean stomatogastric system. 8. Parallels with other invertebrate and vertebrate motor systems.

The Organization of Reduction, Data Flow, and Control Flow Systems. By Werner Kluge. MIT Press, Cambridge, MA. (1992). 470 pages. $50.00.
Contents:
     1. Foreword and introduction. 2. Resource management. 3. Abstract models for processes and systems. 4. Models of computation. 5. Abstract algorithms, reduction and the λ-calculus. 6. The mechanization of a full-fledged λ-calculus. 7. Performing reductions concurrently. 8. Some language issues. 9. An eager graph reduction engine. 10. A lazy graph reduction engine. 11. Compiling functional languages. 12. Data flow systems. 13. Control flow systems. 14. Summary.

Semantics of Programming Languages—Structures and Techniques. By Carl A. Gunter. MIT Press, Cambridge, MA. (1992). 419 pages. $37.50.
Contents:
     1. Introduction. 2. The simply-typed λ-calculus. 3. Categorical models of simple types. 4. Recursive definitions of functions. 5. Two theories of finite approximation. 6. Relating interpretations. 7. Types and evaluation. 8. Universal domains. 9. Subtype polymorophism. 10. Domain theory. 11. Parametric polymorphism.

Proceedings, Tenth National Conference on Artificial Intelligence, American Association for Artificial Intelligence. MIT Press, Cambridge, MA. (1992). 873 pages. $75.00 (paperback).
Contents:
     I. Explanation and tutoring. II. Learning. 1. Constructive and linguistic. 2. Discovery. 3. Inductive. 4. Neural network and hybrid. 5. Robotic. 6. Theory. 7. Utility and bias. III. Multi-agent coordination. IV. Natural language. 8. Interpretation. 9. Parsing. V. Perception. VI. Planning. VII. Problem solving. 10. Constraint satisfaction. 11. Hardness and easiness. 12. Real-time. 13. Search and expert systems. VIII. Representation and reasoning. 14. Abduction and diagnosis. 15. Action and change. 16. Belief. 17. Case-based. 18. Qualitative. 19. Qualitative model construction. 20. Temporal. 21. Terminological. 22. Tractability. IX. Robot navigation. X. Scaling up. XI. Invited talks.

The Design and Analysis of Efficient Learning Algorithms. By Robert E. Schapire. MIT Press, Cambridge, MA. (1992). 217 pages. $32.50.
Contents:

1. Introduction. 2. The strength of weak learnability. 3. Statistical methods for inference of read-once formulas. 4. Efficient distribution-free learning of probabilistic concepts. 5. Inference of finite automata using homing sequences.

Discrete Choice Theory of Product Differentiation. By Simon P. Anderson, André de Palma and Jacques-François Thisse. MIT Press, Cambridge, MA. (1992). 423 pages. $45.00.
Contents:

1. Introduction. 2. Review of discrete choice models. 3. The representative consumer approach. 4. The address approach. 5. A synthesis of alternative preference foundations of product differentiation. 6. Oligopoly with product differentiation. 7. Oligopoly and the logit model. 8. Product selection, location choice, and spatial pricing. 9. Spatial competition and the logit model. 10. Further directions.

Frontiers in Cognitive Neuroscience. Edited by Stephen M. Kosslyn and Richard A. Andersen. MIT Press, Cambridge, MA. (1992). 699 pages. $70.00.
Contents:

I. Vision. 1. Processing streams. 2. Representation. II. Auditory and somatosensory systems. 1. Audition. 2. Somatosensory system. III. Attention. IV. Memory. 1. Storage mechanisms. 2. Memory systems. V. Higher cortical functions. 1. Reasoning. 2. Language.

3-D Computer Animation. By John Vince. Addison-Wesley Publishing Company, Reading, MA. (1992). 363 pages. $39.98.
Contents:

1. Introduction. 2. Review of computer graphics. 3. Modelling schemes. 4. Rendering. 5. Realism. 6. Traditional animation. 7. Computer animation tools. 8. The 3-D animation environment. 9. Modelling and animating. 10. Special animation techniques. 11. Animation systems. 12. Computer animation hardware. 13. Applications for computer animation. 14. The future. Appendix: Supplementary mathematics for computer graphics.