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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,

Professor Ervin Y. Rodin
Campus Box 1040
Washington University in St. Louis
One Brookings Drive
St Louis, MO 63130, U.S.A.

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Boundary Elements XXIII. Edited by D.E. Beskos, C.A. Brebbia, J.T. Katsikadelis and G.D. Manolis. WIT Press, Southampton, U.K. (2001). 496 pages. $269.00.
Contents:

Preface. Section 1. Fracture mechanics and fatigue. Interaction between elliptic hole and crack in thin plate under uniform bending heat flux (J.J. Han and N. Hasebe). Boundary integral equations for plane elastic problems posed on orientations of principal stresses and displacements (A.N. Galybin). Instabilised crack growths (P. Brož). Singular integral equations in 3-D elastic problems for thread-like defects (A.N. Galybin and A.V. Dyskin). Section 2. Plates and shells. Boundary element analysis of rib-stiffened elastic plates (Masa. Tanaka, T. Matsumoto and S. Oida). Plate analysis using classical or Reissner-Mindlin theories (L. Palermo, Jr.). Integral equation method for conical shell under axisymmetric loads (A. Harb). Green's function for thin plate with elliptic hole under bending heat source (N. Hasebe and J.J. Han). Section 3. Geomechanics. Coupled modeling of an impact in tunnel fact burst (P. Procházka). A direct time domain BEM-FEM scheme for soil-structure interaction problems (D.C. Rizos, J. Wang and D.L. Karabalis). Semi-analytic subsidence prediction (P.A. Fokker). Section 4. Dynamics and vibrations. Transient dynamic response of 3-D elastoplastic structures by the D/BEM (G.D. Hatzigeorgiou and D.E. Beskos). Nonlinear dynamic analysis of heterogeneous orthotropic membranes by the analog method (J.T. Katsikadelis and G.C. Tsiatas). Application of boundary element method in frequency response functions of concrete gravity dams (V. Lotfi). Structural dynamics using Gaussian mass matrix (Y.F. Rashed). Section 5. Electrostatics and electromagnetics. Indirect linear equation solvers for magnetostatics boundary element formulations (Z. Fang, M.S. Ingber and M.J. Martinez). Plane wave coupling to finite length cables buried in a lossy ground (D. Poljak, I. Gizdic and V. Roje). Hybridization of a boundary element method with the finite element method in electromagnetics (C.A. 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Gauss quadrature method using wavelet basis as a weighting function for boundary element analysis (K. Abe and K. Koro). Boundary flux reconstruction for narrow band TLC applications (E. Divo and A.J. Kassab). Determination of optimal threshold for matrix compression in wavelet BEM (K. Koro and K. Abe). Definition of two-dimensional condensation via BEM (N. Simões, F. Branco and A. Tadeu). Author index.

Stream Processor Architecture. By Scott Rixner. Kluwer Academic, Boston. (2002). 120 pages. $98.00, EUR 107.00, GBP 68.00.
Contents:

Foreword. Acknowledgments. 1. Introduction. 2. Background. 3. Media processing applications. 4. The imagine stream processor. 5. Data bandwidth hierarchy. 6. Memory access scheduling. 7. Conclusions. References. Index.

Beowulf Cluster Computing with Windows. Edited by Thomas Sterling. The MIT Press, Cambridge, MA. (2002). 445 pages. $39.95.
Contents:

Series foreword. Foreword. Preface. 1. Introduction (Thomas Sterling). I. Enabling technologies. 2. An overview of cluster computing (Thomas Sterling). 3. Node hardware (Thomas Sterling). 4. Windows 2000 (David Solomon). 5. Network hardware (Thomas Sterling). 6. Windows 2000 networking (Mark Russinovich). 7. Setting up clusters:

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Beowulf Cluster Computing with Linux. Edited by Thomas Sterling. The MIT Press, Cambridge, MA. (2002). 496 pages. $39.95.

Contents:

Series foreword. Foreword. Preface. 1. Introduction (Thomas Sterling). I. Enabling technologies. 2. An overview of cluster computing (Thomas Sterling). 3. Node hardware (Thomas Sterling). 4. Linux (Peter H. Beckman). 5. Network hardware (Thomas Sterling). 6. Network software (Thomas Sterling). 7. Setting up clusters: Installation and configuration (Thomas Sterling and Daniel Savarese). 8. How fast is my Beowulf? (David Bailey). II. Parallel programming. 9. Parallel programming with MPI (William Gropp and Ewing Lusk). 10. Advanced topics in MPI programming (William Gropp and Ewing Lusk). 11. Parallel programming with PVM (Al Geist and Stephen Scott). 12. Fault-tolerant and adaptive programs with PVM (Al Geist and Jim Kohl). III. Managing clusters. 13. Cluster workload management (James Patton Jones, David Lifka, Bill Nitzberg and Todd Tannenbaum). 14. Condor: A distributed job scheduler (Todd Tannenbaum, Derek Wright, Karen Miller and Miron Livny). 15. Maui scheduler: A multifunction cluster scheduler (David B. Jackson). 16. PBS: Portable batch system (James Patton Jones). 17. PVFS: Parallel virtual file system (Walt Ligon and Rob Ross). 18. Chiba City: The Argonne scalable cluster (Remy Evard). 19. Conclusions (Thomas Sterling). A. Glossary of terms. B. Annotated reading list. C. Annotated URLs. References. Index.

Information Arts: Intersections of Art, Science, and Technology. By Stephen Wilson. The MIT Press, Cambridge, MA. (2002). 945 pages. $49.95.

Contents:

Selected artists. Selected technologies. Series foreword. Foreword by Joel Slayton. Preface. 1. Introduction, methodology, definitions, and theoretical overview. 2. Biology: Microbiology, animals and plants, ecology, and medicine and the body. 3. Physics, nonlinear systems, nanotechnology, materials science, geology, astronomy, space science, global positioning system, and cosmology. 4. Algorithms, mathematics, fractals, genetic art, and artificial life. 5. Kinetics, sound installations, and robots. 6. Telecommunications. 7. Digital information systems/computers. 8. Resources. Appendixes. A. Methodology. B. Books for further inquiry. Name index. Subject index.

The Origins of Theoretical Population Genetics. By William B. Provine. The University of Chicago Press, Chicago, IL. (1971). 211 pages. $17.00, £11.00.

Contents:

Introduction. 1. Darwin's theory of natural selection: The reaction. Darwin's theory. The reaction. Thomas H. Huxley and "Natura non facit saltum". Francis Galton, regression, and discontinuous evolution. 2. Background to the conflict between Mendelians and biometricians. Karl Pearson: A sketch of his early life. Weldon, Pearson, and biometry. William Bateson and discontinuous evolution. The public controversies. The Cineraria controversy. The struggle over the evolution committee. 3. The conflict between Mendelians and biometricians. The homotyposis controversy. The mutation theory. Inheritance in peas. Heredity in mice. Mendelism and biometry. Meeting of the British association, 1904. Coat color in horses. The effects of the conflict. 4. Darwinian selection: The controversy, 1900-1918. The argument against darwinian selection. Wilhelm Johannsen's pure line theory. Criticism of Johannsen's pure line theory. Herbert Spencer Jennings and pure lines. Raymond Pearl and pure lines. Criticism of the pure line theory. The proof and explanation of the effectiveness of selection. William Ernest Castle and selection theory. The multiple factor theory. Thomas Hunt Morgan and variation for evolution. Oenothera mutants. Pure line theory and selection. Morgan's theory of evolution. Castle and the selection problem. 5. Population genetics: The synthesis of Mendelism, Darwinism, and biometry. Exploration of the mathematical consequences of Mendelian heredity before 1918. Ronald Alymer Fisher. Sewall Wright. J. B. S. Haldane. Conclusions. Appendix: Galton, Pearson, and the law of ancestral heredity. Bibliography. Afterword. Index.

Learning Kernel Classifiers: Theory and Algorithms. By Ralf Herbrich. The MIT Press, Cambridge, MA. (2002). 364 pages. $40.00.

Contents:

Series Foreword. Preface. 1. Introduction. 1.1. The learning problem and (statistical) inference. 1.1.1. Supervised learning. 1.1.2. Unsupervised learning. 1.1.3. Reinforcement learning. 1.2. Learning kernel classifiers. 1.3. The purposes of learning theory.

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Smart Machines in Education. Edited by Kenneth D. Forbus and Paul J. Feltovich. The MIT Press, Cambridge, MA. (2001). 483 pages. $37.95, £25.95.

Contents:

Introduction: The coming revolution in educational technology (Kenneth D. Forbus and Paul J. Feltovich). 1. Representational and advisory guidance for students learning scientific inquiry (Dan Suthers, John Conelly, Alan Lesgold, Massimo Paolucci, Eva Erdosne Toth, Joe Toth and Arlene Weiner). 2. Motivation and failure in educational stimulation design (Roger Schank and Adam Neaman). 3. Technology support for complex problem solving: From SAD environments to AI (Gautam Biswas, Daniel Schwartz, John Bransford and The Teachable Agents Group at Vanderbilt). 4. Growth and maturity of intelligent tutoring systems: A status report (Beverly Park Woolf, Joseph Beck, Christopher Eliot and Mia Stern). 5. Cognitive tutors as modeling tools and instructional models (Kenneth R. Koedinger). 6. Evaluating tutors that listen: An overview of project LISTEN (Jack Mostow and Gregory Aist). 7. Articulate software for science and engineering education (Kenneth D. Forbus). 8. Animated pedagogical agents in knowledge-based learning environments (James C. Lester, Charles B. Callaway, Joël P. Grégoire, Gary D. Stelling, Stuart G. Towns and Luke S. Zettlemoyer). 9. Exploiting model-based reasoning in educational systems: Illuminating the learner modeling problem (Kees de Koning and Bert Bredeweg). 10. The case for considering cultural entailments and genres of attachment in the design of educational technologies (Lisa M. Bouillion and Louis M. Gomez). 11. Learners' (mis)understanding of important and difficult concepts: A challenge to smart machines (Paul J. Feltovich, Richard L. Coulson and Rand J. Spiro). 12. Building the right stuff: Some reflections on the CAETI program and the challenge of educational technology (Kirstie L. Bellman). Afterword: From this revolution to the next (Kenneth D. Forbus and Paul J. Feltovich). Bibliography. Index.

Dynamical Cognitive Science. By Lawrence M. Ward. The MIT Press, Cambridge, MA. (2002). 355 pages. $45.00.

Contents:

Preface. 1. Magic, ritual, and dynamics. 1.1. Magic and ritual. 1.2. Dynamics. 2. Sequence. 2.1. The serial universe. 2.2. The problem of serial order in behavior. 2.3. Markovian analysis of behavior. 3. Rhythms of behavior. 3.1. The dance of life. 3.2. Music and rhythm. 3.3. Rhythms in the brain. 4. Time. 4.1. Space-time. 4.2. The arrow of time. 4.3. Measuring time. 5. Cognitive processes and time. 5.1. Temporal unfolding of cognitive behavior. 5.2. Timing of cognitive behavior. 5.3. Memory. 6. Systems and general systems theory. 6.1. Systems. 6.2. General systems theory. 6.3. Dynamical systems theory. 7. Science and theory. 7.1. The mandala of science. 7.2. Formal theories. 7.3. Principle of complementarity. 8. Dynamical versus statistical models. 8.1. Theories, models, and data. 8.2. Statistical models. 8.3. Dynamical models. 8.4. Why we need both statical and dynamical models. 9. Dynamical and structural models. 9.1. Structural models. 9.2. Graph theory. 9.3. Interplay between dynamical and structural models. 10. Deterministic versus stochastic dynamical models. 10.1. Deterministic models. 10.2. Stochastic models. 10.3. Do we need both? 11. Linear time series analysis. 11.1. Time series and noise. 11.2. ARIMA (p, d, q). 11.3. ARIMA model of time estimation. 11.4. Mixed regression-ARIMA model of psychophysical judgment. 12. Probability theory and stochastic models. 12.1. Dynamical cognitive science and mathematics. 12.2. Stochastic processes: A random walk to ruin. 12.3. Critical points in stochastic models. 12.4. Ergodicity and the Markov property. 13. Stochastic models in physics. 13.1. The master equation. 13.2. Quantum physics. 13.3. Complementarity redux. 14. Noise. 14.1. What is noise? 14.2. Probabilistic description of noise. 14.3. Spectral properties of noise. 15. Colored noise. 15.1. The ubiquity of colored noise. 15.2. The vicissitudes of the exponent α. 15.3. Colored noise in living systems. 16. $1/f$ noise in human cognition. 16.1. Music and time perception. 16.2. Reaction time. 17. $1/f$ noise in the brain. 17.1. Neural activity. 17.2. Magnetoencephalogram recordings. 17.3. Electroencephalogram and event-related potential recordings. 18. Models of $1/f$ noise. 18.1. The simplest case. 18.2. Multiplicative noise. 18.3. Self-organized criticality. 18.4. Center-surround neural network. 19. Statistical theory of $1/f$ noise. 19.1. What must be explained. 19.2. Queuing in a wire. 19.3. ARIMA $(1, 0, 0)$. 19.4. Multifractals and wild self-affinity. 20. Stochastic resonance. 20.1. What is stochastic resonance? 20.2. Stochastic resonance in a threshold detector. 21. Stochastic resonance and perception. 21.1. Detection of weak signals by animals. 21.2 Neural networks. 23. Chaos. 23.1. Chaos is not what you think it is. 23.2. What chaos really is. 23.3. Phase space drawings and strange attractors. 24. Chaos and randomness. 24.1. A random walk through the logistic difference equation. 24.2. Dimensionality of an attractor. 24.3. Chaos and noise. 25. Nonlinear time series analysis. 25.1. State space reconstruction. 25.2. Out-of-sample forecasting. 25.3. Surrogate data. 26. Chaos in human behavior? 26.1. Could unexplained variance be chaos? 26.2. Nonlinear forecasting analysis of time estimation. 26.3. Nonlinear analysis of mental illness. 26.4. Memory and the logistic difference equation. 27. Chaos in the brain? 27.1. The smell of chaos. 27.2. Dimensionality of the electroencephalogram. 27.3. Chaotic event-related potentials? 28. Perception of sequence. 28.1. The gambler's fallacy. 28.2. Estimation of short-run probabilities. 28.3. Evolution of contingency perception. 29. Can people behave randomly? 29.1. No! 29.2. Sometimes. 29.3. Sequential dependencies and extrasensory perception. 30. Can people behave chaotically? 30.1. Yes! 30.2. Not really. 30.3. Heuristics and chaos. 31. Relaxation oscillators: A foundation for dynamical modeling. 31.1 A brief taxonomy of oscillators. 31.2. The van der Pol relaxation oscillator. 31.3. Noisy oscillators in the brain. 32. Evolution and ecology of cognition. 32.1. Evolution of cognition. 32.2. Ecology of cognition. 33. Dynamical cognitive neuroscience. 33.1. Brain imaging. 33.2. Brain dynamics. 33.3 Hybrid models. 34. Dynamical computation. 34.1. Numerical methods. 34.2. Neural network models. 34.3. Exotic computers. 35. Dynamical consciousness. 35.1. Consciousness. 35.2. Unity of science. References. Index.

Learning with Kernels: Support Vector Machines, Regularization, Optimization, and Beyond. By Bernhard Schölkopf and Alexander J. Smola. The MIT Press, Cambridge, MA. (2002). 626 pages. $60.00.

Contents:

Series. Foreword. Preface. 1. A tutorial introduction. 1.1. Data representation and similarity. 1.2. A simple pattern recognition algorithm. 1.3. Some insights from statistical learning theory. 1.4. Hyperplane classifiers. 1.5. Support vector classification. 1.6. Support vector regression. 1.7. Kernel principal component analysis. 1.8. Empirical results and implementations.

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Computational Methods and Experimental Measurements X Edited by Y. Villacampa Esteve, G.M. Carlomagno and C.A. Brebbia. WIT Press, Southampton. 1018 pages. $449.00.

Contents:

Section 1. Fluid dynamics. Steady and unsteady flow solutions using velocity singularities for fixed and oscillating aerofoils and wings (D. Mateescu). Numerical simulation of a cylinder far wake (G. Sciortino, M.A. Boniforti and M. Morganti). Experimental analysis of air bubble inside a centrifugal pump (A. Amoresano, G. Langella and C. Noviello). Flow and thermal characteristics of warm plane air jets (measurements and predictions using different k-ϵ models) (T. Törnström, S. Amiri and B. Moshfegh). Unsteady transonic cascade flows and the effects of turbulence models (Y. Noguchi, S.D. Allison and T. Shiratori). A new hybrid scheme for turbulent flow calculations (Y. Noguchi, M.A. Humayun and T. Shiratori). A comparison of turbulence models for an impinging jet in a crossflow (C. Diaz and J. Tso). Correction of the wall interference effects in wind tunnel experiments (G. Lombardi, M.V. Salvetti and M. Morelli). The gas curtain experimental technique and analysis methodologies (J. Kamm, W. Rider, P. Rightley, K. Prestridge, R. Benjamin and P. Vorobieff). Numerical and experimental investigation of top submerged gas injection system (Y.S. Morsi, W. Yang, D. Achim and A. Acquadro). Numerical and experimental investigation of top submerged gas injection system (Y.W. Morsi, W. Yang, D. Achim and A. Acquadro). Nano-scale studies of the tensile properties of liquids in an atomic force microscope (P.R. Williams, N. Hilal, W.R. Bowen and M. Barrow). Numerical simulation of confined laminar flow over a backward-facing step using a novel viscous-splitting vortex algorithm (R.W. Barber and A. Fonty). Effects of non-reflecting boundary conditions on the convergence rate and the size of solution domain (S. Talebi and E. Shirani). The optimal control applied to diffusion-reaction models (M.J. Pujol and J.A. Sánchez and P. Grimalt). Flow visualisation, pressure measurements and CFD calculations on spike-tipped bodies (J. Srulijes, P. Gnemmi, K. Runne and F. Seiler). Ship flow experimental database for RANSE codes validation (A. Olivieri, F. Pistani and R. Penna). Generalized equation predicts viscosity of heavy oil-solvent mixtures (A. Miadonye and A.J. Britten). Experimental model for casting problems (T.A. Kowalewski, A. Cybulski and T. Sobiecki). Interaction of water waves with a submerged sphere in the ocean of finite depth: Numerical simulation and graphical visualization (M. Rahman and S. Iakovlev). Direct statistical comparison of hydrodynamic mixing experiments and simulations (W. Rider, J. Kamm, P. Rightley, K. Prestridge, R. Benjamin and P. Vorobieff). Experimental and numerical study of shock wave propagation over cylinders and spheres (A. Abe, K. Takayama and K. Itoh). Effect of wave breaking in vertical diffusion coefficient (H. Kim and C. Jang). Evaluating the implementation of shallow water equations within numerical models focusing the propagation of dambreak waves (R. Liem, J. Schramm and J. Köngeter). Interactive effect of shock wave with porous foam (K. Kitagawa, M. Kainuma, K. Takayama and M. Yasuhara). Finite element analysis of transient unsaturated flow: Deterministic vs. stochastic approach (C.G. Aguirre and K. Haghighi). Application of a linear microphone array for noise source detection in the CIRA calibration tunnel #2 (A. Ragni, P. Jordan and J. Fitzpatrick).

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Moving Boundaries VI: Computational Modelling of Free and Moving Boundary Problems. Edited by B. Šarler and C.A. Brebbia. WIT Press, Southampton. (2001). 252 pages. $144.00.
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Highly Parallel Computations: Algorithms and Applications Edited by M.P. Bekakos. Southampton, U.K. (2001). 433 pages. $245.00.
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The Mind's Arrows: Bayes Nets and Graphical Causal Models in Psychology. By Clark Glymour. The MIT Press, Cambridge, MA. (2001). 222 pages. $30.00.

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Turing's Connectionism: An Investigation of Neural Network Architectures. By Christof Teuscher. Springer, New York. (2002). 200 pages. $79.95, sFr 147.66, GBP 49.00.

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Theoretical Neuroscience: Computational and Mathematical Modling of Neural Systems. By Peter Dayan and L. F. Abbot. The MIT Press, Cambridge, MA. (2001). 460 pages. $50.00, £34.50.

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Financial Engineering and Computation: Principles, Mathematics, Algorithms. By Yuh-Dauh Lyuu. Cambridge University Press, New York. (2002). 627 pages. $69.95.

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Periodic Integral and Pseudodifferential Equations with Numerical Applications. By Jukka Saranend and Gennadi Vainikko. Springer, Berlin. (2002). 452 pages. $89.95.

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Essential Mathematics for Computer Graphics Fast. By John Vince. Springer, London. (2001). 229 pages. $29.95.

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Method of Difference Potentials and Its Applications. By V. S. Ryaben'kii. Springer, Berlin. (2002). 538 pages. $89.95, EUR 79.95.

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