

References

- Aardal K, Bixby RE, Hurkens CAJ, Lenstra AK, Smeltink JW (2000) Market Split and Basis Reduction: Towards a Solution of the Cornuéjols–Dawande Instances, *INFORMS Journal on Computing* 12:192–202.
- Abadie J, Carpentier J (1969) Generalization of the Wolfe Reduced Gradient Method to the Case of Nonlinear Constraints, in Fletcher R (ed.), *Optimization*: 37–47, Academic Press, London.
- Achterberg T (2007) Conflict Analysis in Mixed Integer Programming, *Discrete Optimization* 4:4–20.
- Achterberg M, Berthold T (2005) Improving the Feasibility Pump, technical report 5–42, Konrad–Zuse–Zentrum für Informationstechnik Berlin.
- Achterberg T, Koch T, Martin A (2006) MIPLIB 2003, *Operations Research Letters* 34:1–12.
- Adem J, Gochet W (2006) Mathematical Programming Based Heuristics for Improving LP–Generated Classifiers for the Multiclass Supervised Classification Problem, *European Journal of Operational Research* 168:181–199.
- Aggarwal C, Ahuja R, Hao J, Orlin JB (1998) Diagnosing Infeasibilities in Network Flow Problems, *Mathematical Programming* 81:263–280.
- Agmon S (1954) The Relaxation Method for Linear Inequalities, *Canadian Journal of Mathematics* 6:382–392.
- Amaldi E (1994) From Finding Maximum Feasible Subsystems of Linear Systems to Feed-forward Neural Network Design, PhD thesis no. 1282, Département de Mathématiques, École Polytechnique Fédérale de Lausanne, Switzerland.
- Amaldi E (2003) The maximum feasible subsystem problem and some applications, in Agnetis A, Di Pillo G, Eds., *Modelli e Algoritmi per l’Ottimizzazione di Sistemi Complessi*, Pitagora Editrice Bologna, 31–69.
- Amaldi E, Belotti P, Hauser R (2005) Randomized relaxation methods for the maximum feasible subsystem problem, *Proceedings of the 14th Integer Programming and Combinatorial Optimization conference (IPCO’05)*, *Lecture Notes in Computer Science* 3509, Springer–Verlag, 249–264.
- Amaldi E, Bruglieri M, Casale G (2007) A Two–Phase Relaxation–Based Heuristic for the Maximum Feasible Subsystem Problem, *Computers and Operations Research*, to appear (available online now).
- Amaldi E, Kann V (1995) The Complexity and Approximability of Finding Maximum Feasible Subsystems of Linear Relations, *Theoretical Computer Science* 147:181–210.
- Amaldi E, Kann V (1998) On the Approximability of Minimizing Nonzero Variables or Unsatisfied Relations in Linear Systems, *Theoretical Computer Science* 209:237–260.
- Amaldi A, Mattavelli M (2002) The MIN PFS Problem and Piecewise Linear Model Estimation, *Discrete Applied Mathematics* 118:115–143.
- Amaldi E, Pfetsch M, Trotter Jr. L (1999) Structural and Algorithmic Properties of the Maximum Feasible Subsystem Problem, *Proceedings of the Integer Programming and Combinatorial Optimization conference (IPCO’99)*, *Lecture Notes in Computer Science* 1610, Springer–Verlag, New York, NY, 45–59.

- Amaral P (2001) *Contribuições Para o Estudo de Sistemas Lineares Inconsistentes*, PhD Dissertation, Faculty of Science and Technology, UNL, Lisbon, Portugal (in Portuguese).
- Amaral P, Barahona P (2005) Connections Between the Total Least Squares and the Correction of an Infeasible System of Linear Inequalities, *Linear Algebra and its Applications* 395:191–210.
- Amaral P, Barahona P (2005a) A Framework for Optimal Correction of Inconsistent Linear Constraints, *Constraints* 10:67–86.
- Amaral P, Júdice J, Serali HD (2006) A Reformulation–Linearization–Convexification Algorithm for Optimal Correction of an Inconsistent System of Linear Constraints, *Computers and Operations Research*, to appear (available online now).
- Amarger RJ, Biegler LT, Grossmann IE (1992) An Automated Modelling and Reformulation System for Design Optimization, *Computers and Chemical Engineering* 16:623–636.
- Andersen ED, Andersen KD (1995) Presolving in Linear Programming, *Mathematical Programming* 71:221–245.
- Andersen ED, Gondzio J, Mészáros C, Xu X (1996) Implementation of interior point methods for large scale linear programming, in Terlaky T (ed.), *Interior Point Methods in Mathematical Programming*, Kluwer Academic Publishers: 189–252.
- Atlihan MK, Schrage L (2006) Generalized Filtering Algorithms for Infeasibility Analysis, *Computers and Operations Research*, to appear (available online now).
- Bailey J, Stuckey PJ (2005) Discovery of Minimal Unsatisfiable Subsets of Constraints Using Hitting Set Dualization, in Hermenegildo M (ed.), *Proceedings of the International Conference of Practical Applications of Declarative Languages*, Lecture Notes on Computer Science 3350:174–186, Springer–Verlag.
- Bakker RR, Dikker F, Tempelman F, Wognum PM (1993) Diagnosing and solving over-determined constraint satisfaction problems, in *Proceedings of IJCAI'93*, 276–281.
- Balas E, Ceria S, Dawande M, Margot F, Pataki G (2001) OCTANE: a New Heuristic for Pure 0–1 Programs, *Operations Research* 49:207–225.
- Balas E, Martin C (1980) Pivot and Complement—a Heuristic for 0–1 Programming, *Management Science* 26:224–234.
- Balas E, Martin C (1986) Pivot and Shift—a Heuristic for Mixed Integer Programming, GSIA Technical Report, Carnegie Mellon University.
- Balas E, Ng SM (1989) On the set covering polytope: I. All the facets with coefficients in $\{0,1,2\}$, *Mathematical Programming* 43:57–69.
- Balas E, Schmieta S, Wallace C (2004) Pivot and Shift—a Mixed Integer Programming Heuristic, *Discrete Optimization* 1:3–12.
- Banerjee I, Ierapetritou MG (2005) Feasibility Evaluation of Nonconvex Systems Using Shape Reconstruction Techniques, *Industrial and Engineering Chemistry Research* 44:3638–3647.
- Bartak R (1999) Constraint Programming: In Pursuit of the Holy Grail, *Proceedings of the 8th Annual Conference of Doctoral Students WDS'99*.
- Beale EML, Tomlin JA (1970) Special facilities in a general mathematical programming system for nonconvex problems using ordered sets of variables, *Proceedings of the Fifth International Conference on Operational Research*, Tavistock publication, London, 447–454.
- Bemporad A, Garulli A, Paoletti S, Vicino A (2005) A Bounded–Error Approach to Piecewise Affine System Identification, *IEEE Transactions on Automatic Control* 50:1567–1580.
- Benichou M, Gauthier JM, Girodet P, Hentges G, Ribiere G, Vincent O (1971). Experiments in mixed–integer linear programming, *Mathematical Programming* 1:76–94.

- Bennett KP, Bredensteiner E (1997) A Parametric Optimization Method for Machine Learning, *INFORMS Journal on Computing* 9:311–318.
- Berbee HCP, Boender CGE, Rinooy Kan AHG, Scheffer CL, Smith RL, and Telgen J (1987) Hit-and-Run Algorithms for the Identification of Nonredundant Linear Inequalities, *Mathematical Programming* 37:184–207.
- Bertacco L, Fischetti M, Lodi A (2005) A Feasibility Pump Heuristic for General Mixed-Integer Problems, technical report OR-05-5, D.E.I.S. Operations Research Group, Università di Bologna.
- Berthold T (2006) Primal Heuristics for Mixed Integer Programs, master's thesis, Technische Universität Berlin.
- Bixby R, Ceria S, McZeal CM, Savelsbergh MWP (1996) MIPLIB 3.0, World Wide Web <http://www.caam.rice.edu/~bixby/miplib/miplib.html>.
- Boman EG (1999), Infeasibility and Negative Curvature in Optimization, PhD thesis, Scientific Computing and Computational Mathematics, Stanford University.
- Bonami P, Cornuejols G, Lodi A, Margot F (2006) A Feasibility Pump for Mixed Integer Nonlinear Programs, IBM Research Report RC23862 (W0602- 029).
- Boneh A (1983) PREDUCE—a Probabilistic Algorithm Identifying Redundancy by a Random Feasible Point Generator (RFPG) in Karwan, Lotfi, Telgen, Zionts (eds.), *Lecture Notes in Economics and Mathematical Systems* 206.
- Bongartz I, Conn AR, Gould N, Toint PL (1995) CUTE: constrained and unconstrained testing environment, *ACM Transactions on Mathematical Software* 21:123–160. See <http://www.sor.princeton.edu/~rvdb/ampl/nlmodels/cute/index.html> for CUTE models in AMPL format.
- Bonner & Moore (1979) RPMS (Refinery and Petrochemical Modeling System): a System Description, Bonner & Moore Management Science, Houston.
- Boussemart F, Hemery F, Lecoutre C, Sais L (2004) Boosting systematic search by weighting constraints, in *Proceedings of the 16th European Conference on Artificial Intelligence (ECAI'04)*, 146–150.
- Bordetski AB, Kazarinov LS (1981) Determining the Committee of a System of Weighted Inequalities, *Kibernetika* 6:44–48.
- Brearily AL, Mitra G, Williams (1975) Analysis of Mathematical Programming Problems Prior to Applying the Simplex Algorithm. *Mathematical Programming* 8:54–83.
- Bremner D, Fukuda K, Rosta V (2006) Primal-Dual Algorithms for Data Depth, in Liu RY (ed.), *Data Depth: Robust Multivariate Analysis, Computational Geometry and Applications*, DIMACS series in Discrete Mathematics and Theoretical Computer Science 72:171–194.
- Brown G, Graves G (1975) Elastic Programming: A New Approach to Large-Scale Mixed Integer Optimization, presented at ORSA/TIMS Conference, Las Vegas.
- Bruni R (2005) On Exact Selection of Minimally Unsatisfiable Subformulae, *Annals of Mathematics and Artificial Intelligence* 43: 35–50.
- Bruni R (2005a) Error Correction for Massive Data Sets, *Optimization Methods and Software* 20:295–314.
- Bruni R, Reale A, Torelli R (2001) Optimization Techniques for Edit Validation and Data Imputation, *Proceedings of Statistics Canada Symposium 2001, Ottawa*.
- Bruynooghe M (1981) Solving Combinatorial Search Problems by Intelligent Backtracking, *Information Processing Letters* 12:36–39.
- Burg J, Lang SD, Hughes CE (1994) Finding Conflict Sets and Backtrack Points in CLP(R), in Van Hentenryck P (ed.), *Proceedings of the 11th International Logic Programming Conference*, MIT Press, 323–338.

- Byrne C, Censor Y (2001) Proximity Function Minimization Using Multiple Bregman Projections, with Applications to Split Feasibility and Kullback–Leibler Distance Minimization, *Annals of Operations Research* 105:77–98.
- Caron RJ, Greenberg HJ, Holder AG (2002) Analytic centers and repelling inequalities, *European Journal of Operational Research* 143:268–290.
- Carver WB (1921) Systems of Linear Inequalities, *Annals of Mathematics* 23, series 2:212–220.
- Censor Y (2003) Mathematical Optimization for the Inverse Problem of Intensity Modulated Radiation Therapy, in Palta JR, Mackie TR (eds.), *Intensity–Modulated Radiation Therapy: The State of The Art*, American Association of Physicists in Medicine, Medical Physics Monograph No. 29, Medical Physics Publishing, Madison, Wisconsin, 25–49.
- Censor Y (2006) Computational Acceleration of Projection Algorithms for the Linear Best Approximation Problem, *Linear Algebra and its Applications* 416:111–123.
- Censor Y, Ben–Israel A, Xiao Y, Galvin JM (2006) On Linear Infeasibility Arising in Intensity–Modulated Radiation Therapy Inverse Planning, working paper, University of Haifa, Israel.
- Censor Y, Elfving T (1982) New methods for linear inequalities, *Linear Algebra and its Applications* 42:199–211.
- Censor Y, Elfving T, Herman, GT (2001) Averaging Strings of Sequential Iterations for Convex Feasibility Problems, in Butnariu D, Censor Y, Reich S, eds. *Inherently Parallel Algorithms in Feasibility and Optimization and their Applications*, Elsevier Science B.V., Amsterdam. 101–113.
- Censor Y, Gordon D, and Gordon R (2001) Component Averaging: An Efficient Iterative Parallel Algorithm for Large and Sparse Unstructured Problems, *Parallel Computing* 27:777–808.
- Censor Y, Zenios SA (1997) *Parallel Optimization: Theory, Algorithms, and Applications*. Oxford University Press, New York.
- Chakravarti N (1994) Some Results Concerning Post–Infeasibility Analysis, *European Journal of Operational Research* 73:139–143.
- Charnes A, Cooper WW (1961) *Management Models and Industrial Applications of Linear Programming*, John Wiley and Sons, New York.
- Chen D (2007) A Branch and Cut Algorithm for the Halfspace Depth Problem, MCS thesis, the University of New Brunswick, Canada.
- Chen XB, Kostreva MM (1999) Global Convergence Analysis of Algorithms for Finding Feasible Points in Norm–Relaxed MFD, *Journal of Optimization Theory and Applications* 100:287–309.
- Chinneck JW (1990) MINOS(IIS) software, World Wide Web, <http://www.sce.carleton.ca/faculty/chinneck/minosiis.html>, 1990–2006.
- Chinneck JW (1990a) Formulating Processing Networks: Viability Theory, *Naval Research Logistics* 37:245–261.
- Chinneck JW (1990b) VIABLE1—Code for Identifying Nonviabilities in Processing Network Models, *European Journal of Operational Research* 44:119–120.
- Chinneck JW (1992) Viability Analysis: A Formulation Aid for All Classes of Network Models, *Naval Research Logistics* 39:531–543.
- Chinneck JW (1993) Netlib Repository of Infeasible LP Instances, World Wide Web <http://www.netlib.org/lp/infeas/>.
- Chinneck, JW (1994), MINOS(IIS): Infeasibility Analysis Using MINOS, *Computers and Operations Research* 21:1–9.
- Chinneck, JW (1995) Analyzing Infeasible Nonlinear Programs, *Computational Optimization and Applications* 4:167–179.

- Chinneck JW (1996a) "Computer Codes for the Analysis of Infeasible Linear Programs", *Journal of the Operational Research Society* 47:61–72.
- Chinneck JW (1996b) Localizing and Diagnosing Infeasibilities in Networks, *ORSA Journal on Computing* 8:55–62.
- Chinneck, JW (1996c) An Effective Polynomial-Time Heuristic for the Minimum-Cardinality IIS Set-Covering Problem, *Annals of Mathematics and Artificial Intelligence* 17:127–144.
- Chinneck JW (1997a) Feasibility and Viability, in *Advances in Sensitivity Analysis and Parametric Programming*, Gal T, Greenberg HJ (eds.), *International Series in Operations Research and Management Science*. 6:14–1 to 14–41, Kluwer Academic Publishers.
- Chinneck JW (1997b), Finding a Useful Subset of Constraints for Analysis in an Infeasible Linear Program, *INFORMS Journal on Computing* 9:164–174.
- Chinneck JW (1998) Improved linear classification via LP infeasibility analysis, *Technical Report SCE-98-09*, Department of Systems and Computer Engineering, Carleton University, Ottawa, Canada.
- Chinneck JW (2001) Analyzing Mathematical Programs using MProbe, *Annals of Operations Research* 104:33–48.
- Chinneck JW (2001a) Fast Heuristics for the Maximum Feasible Subsystem Problem, *INFORMS Journal on Computing* 13:210–223.
- Chinneck JW (2002) Discovering the Characteristics of Mathematical Programs via Sampling", *Optimization Methods and Software* 17:319–352.
- Chinneck JW (2002a) Guest Editor, Special Issue on The Merging of Mathematical Programming and Constraint Programming, *INFORMS Journal on Computing* 14.
- Chinneck JW (2004) The Constraint Consensus Method for Finding Approximately Feasible Points in Nonlinear Programs, *INFORMS Journal on Computing* 16:255–265.
- Chinneck JW, Dravnieks EW (1991) Locating Minimal Infeasible Constraint Sets in Linear Programs, *ORSA Journal on Computing* 3:157–168.
- Chinneck JW, Michalowski M (1996) MOLP Formulation Assistance Using LP Infeasibility Analysis, in Tamiz M (ed.) *Multi-Objective Programming and Goal Programming: Theories and Applications*, *Lecture Notes in Economics and Mathematical Systems*, 432:87–106.
- Chinneck JW, Saunders, MA (1995) MINOS(IIS) Version 4.2: Analyzing Infeasibilities in Linear Programs, *European Journal of Operational Research* 81:217–218.
- Chvátal, V (1983) *Linear Programming*, W.H. Freeman and Company, New York.
- Cimmino G (1938) *Calcolo Approssimato per Soluzioni dei Sistemi di Equazioni Lineari*. *La Ricerca Scientifica XVI*, Series II, Anno IX 1:326–333.
- Codato G, Fischetti M (2004) Combinatorial Benders' Cuts, *Proceedings of IPCO*, *Lecture Notes in Computer Science* 3064:178–195.
- Codato G, Fischetti M (2006) Combinatorial Benders' Cuts for Mixed-Integer Linear Programming, *Operations Research* 54:756–766.
- Conrad J, Gomes CP, van Hoeve WJ, Sabharwal A, Suter J (2007) Connections in Networks: Hardness of Feasibility vs. Optimality, in Van Hentenryck P, Wolsey L (eds.), *Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimization Problems*, *Proceedings of the 4th International Conference CPAIOR 2007*, Springer, *Lecture Notes in Computer Science* 4510:16–28.
- Cornuéjols G, Dawande M (1998) A Class of Hard Small 0–1 Programs, in Bixby RE, Boyd EA, Ríos-Mercado RZ (eds.), *Integer Programming and Combinatorial Optimization*, 6th International IPCO Conference, *Lecture Notes in Computer Science* 1412:284–293, Springer-Verlag, Berlin.
- Crowder H, Johnson EL, Padberg M (1983) Solving Large-Scale Zero-One Linear Programming Problems, *Operations Research* 31: 803–834.

- Dakin RJ (1965) A Tree Search Algorithm for Mixed Integer Programming Problems, *Computer Journal* 8:250–255.
- Danna E, Rothberg E, Le Pape C (2005) Exploring Relaxation Induced Neighborhoods to Improve MIP Solutions, *Mathematical Programming* 102:71–90.
- Dantzig GB, Thapa MN (1997) *Linear Programming, 1: Introduction*, Springer–Verlag, New York.
- Dash Optimization (2006) *XPRESS–Optimizer User Manual*, Dash Optimization.
- Davey B, Boland N, Stuckey PJ (2002) Efficient Intelligent Backtracking Using Linear Programming, *INFORMS Journal on Computing* 14:373–386.
- Davis M, Logemann G, Loveland D (1962) A Machine Program for Theorem Proving, *Communications of the ACM* 5:394–397.
- Davis M, Putnam H (1960) A Computing Procedure for Quantification Theory, *Journal of the ACM* 7:201–215.
- Dax, A (2006) The l_1 Solution of Linear Inequalities, *Computational Statistics and Data Analysis* 50:40–60.
- DeBacker B, Beringer H (1991) Intelligent Backtracking for CLP Languages, an Application to CLP(R), *International Logic Programming Symposium, San Diego*, 405–419.
- De Backer B, Beringer H (1993) A CLP Language Handling Disjunctions of Linear Constraints, *International Conference on Logic Programming*, 550–563.
- Debrosse CJ, Westerberg AW (1973) A Feasible–Point Algorithm for Structured Design Systems in Chemical Engineering, *AIChE Journal* 19:251–258.
- Dechter R, Rossi F (2002) Constraint satisfaction, in Nadel L. (ed.), *Encyclopedia of Cognitive Science*, Nature Publishing Group, London, 2002.
- de Givry S, Larrosa J, Meseguer P, Schiex T (2003) Solving Max–SAT as Weighted CSP, *Principles and Practice of Constraint Programming CP 2003, Lecture Notes in Computer Science* 2833:363–376.
- De Pierro AR, Iusem AN (1985) A Simultaneous Projection Method for Linear Inequalities, *Linear Algebra and its Applications* 64:243–253.
- de Siqueira N. JL, Puget JF (1988) Explanation–Based Generalisation of Failures. *European Conference on Artificial Intelligence*: 339–344.
- Dravnieks EW (1989) Identifying Minimal Sets of Inconsistent Constraints in Linear Programs: Deletion, Squeeze and Sensitivity Filtering, MSc thesis, Systems and Computer Engineering, Carleton University.
- Dravnieks EW, Chinneck JW (1997) Formulation Assistance for Global Optimization Problems, *Computers and Operations Research* 24:1151–1168.
- Drud AS (1994) CONOPT–A Large Scale GRG Code, *ORSA Journal on Computing* 6:207–216.
- Duran M, Grossmann IE (1986) An Outer–Approximation Algorithm for a Class of Mixed–Integer Nonlinear Programs, *Mathematical Programming* 36:307–339.
- Dyer ME (1983) The Complexity of Vertex Enumeration Methods, *Mathematics of Operations Research* 8:381–402.
- Eckstein J (1994) Parallel branch–and–bound algorithms for general mixed integer programming on the CM–5, *SIAM Journal on Optimization* 4:794–814.
- Ellison EFD, Hajian M, Jones H, Levkovitz R, Maros I, Mitra G, Sayers D (1999) *FortMP Manual*, Numerical Algorithms Group and Brunel University.
- Elwakeil OA, Arora JS (1995) Methods for Finding Feasible Points in Constrained Optimization, *AIAA Journal* 33:1715–1719.
- Elwakeil OA, Arora JS (1996) Two algorithms for global optimization of general NLP problems, *International Journal for Numerical Methods in Engineering* 39:3305–3325.
- Fan, K (1956) On Systems of Linear Inequalities, *Annals of Mathematical Studies* 38:99–156.

- Feng, J (1999). Nonlinear Redundancy: Where is the Information? M.Sc., Mathematics, Department of Economics, Mathematics, and Statistics, University of Windsor, Canada.
- Ferris MC, Dirkse SP, Meeraus A (2005) Mathematical programs with equilibrium constraints: Automatic reformulation and solution via constrained optimization, in Kehoe TJ, Srinivasan TN, Whalley J (eds.), *Frontiers in Applied General Equilibrium Modeling*, 67–93, Cambridge University Press.
- Fischetti M, Glover F, Lodi A (2005) The Feasibility Pump, *Mathematical Programming A* 104:91–104.
- Fischetti M, Lodi A (2003) Local Branching, *Mathematical Programming B* 98:23–49.
- Ford LR, Fulkerson DR (1962) *Flows in Networks*, Princeton University Press, Princeton, NJ.
- Fourer R, Gay DM, Kernighan BW (2003) *AMPL: A Modeling Language for Mathematical Programming*, Second Edition, Brooks/Cole, Pacific Grove, California, USA.
- Fourer R, Orban D (2007) DrAmpl—A meta solver for optimization, technical report G–2007–10, GERAD, Montreal, Canada.
- Fourier JBJ (1827) Analyse des Travaux de l’Académie Royale des Sciences Pendant l’Année 1824, *Histoire de l’Académie Royale des Sciences de l’Institut de France* 7:xlvii–lv.
- Fränzle M, Herde C (2005) Efficient Proof Engines for Bounded Model Checking of Hybrid Systems, *Electronic Notes in Theoretical Computer Science* 133 :119–137.
- Frean M (1992) A “Thermal” Perceptron Learning Rule, *Neural Computation* 4:946–957.
- Freuder EC, Wallace RJ (1992) Partial Constraint Satisfaction, *Artificial Intelligence* 58: 21–70.
- Frontline Systems Inc. (2007) World Wide Web <http://www.solver.com/sdkplatformd.htm#Diagnosing%20Infeasibility>.
- Fukuda K, Rosta V (2005) Data Depth and Maximum Feasible Subsystems, in Avis D, Hertz A, Marcotte O (eds.), *Graph Theory and Combinatorial Optimization*, Springer 37–67.
- Fulkerson DR (1959) A Network Flow Feasibility Theorem and Combinatorial Applications, *Canadian Journal of Mathematics* 11:440–451.
- Fylstra D, Lason L, Watson J, Waren A (1998) Design and Use of the Microsoft Excel Solver, *Interfaces* 28:29–55.
- Gale D (1957) A Theorem in Networks, *Pacific Journal of Mathematics* 7:1073–1082.
- Ganapathy V, Jha S, Chandler D, Melski D, Vitek D (2003) Buffer Overrun Detection Using Linear Programming and Static Analysis, *Proceedings of the 10th ACM Conference on Computer and Communications Security*: 345–354.
- Gauthier JM, Ribiere G (1977) Experiments in mixed–integer linear programming, *Mathematical Programming* 12:26–47.
- Gertz M, Nocedal J, Sartenaer A (2004) A Starting–Point Strategy for Nonlinear Interior Methods, *Applied Mathematics Letters* 17:945–952.
- Gill PE, Murray W, Saunders MA (2005) SNOPT : an SQP Algorithm for Large–Scale Constrained Optimization, *SIAM Review* 47:99–131.
- Gleeson J, Ryan J (1990) Identifying Minimally Infeasible Subsystems of Inequalities, *ORSA Journal on Computing* 2:61–63.
- Glover F (1968) Surrogate Constraints, *Operations Research* 16:741–749.
- Glover F (1990) Tabu Search: A Tutorial, *Interfaces*, 20:74–94.
- Glover F (2003) Tutorial on Surrogate Constraint Approaches for Optimization in Graphs, *Journal of Heuristics* 9:175–227.

- Glover F, Laguna M, Martí R (2000) Fundamentals of Scatter Search and Path Relinking, *Control and Cybernetics* 29:653–684.
- Glover F, Laguna M, Martí R (2003) Scatter search and path relinking: Advances and applications”, in Glover FW, Kochenberger GA (eds.), *Handbook of Metaheuristics*, International Series in Operations Research & Management Science 57:1–36, Kluwer Academic Publishers, Boston.
- Glover F, Laguna M, Martí R (2004) New Ideas and Applications of Scatter Search and Path Relinking, in *New Optimization Technologies in Engineering*, Onwubolu GC, Babu BV (eds.), *Studies in Fuzziness and Soft Computing* 141:367–384, Springer.
- Goyal V, Ierapetritou MG (2003) Framework for Evaluating the Feasibility/Operability of Nonconvex Processes, *American Institute of Chemical Engineering Journal* 49:1233–1240.
- Grant M (2004) *Disciplined Convex Optimization*, PhD thesis, Electrical Engineering, Stanford University.
- Grant M, Boyd S, Ye Y (2006) *Disciplined Convex Programming*, in Liberti L, Maculan N (eds.) *Global Optimization: From Theory to Implementation*, *Nonconvex Optimization and its Applications* 84:155–210, Springer.
- Greenberg HJ (1978) Pivot Selection Tactics, in Greenberg HJ (ed.), *Design and Implementation of Optimization Software*, Sijthoff and Noordhoff:143–174.
- Greenberg HJ (1981a) The Scope of Computer-Assisted Analysis and Model Simplification, In: Greenberg HJ, Maybee JS (eds.), *Computer-Assisted Analysis and Model Simplification*, Academic Press, New York: 17–26.
- Greenberg HJ (1981b) Implementation Aspects of Model Management: A Focus on Computer-Assisted Analysis, In: Greenberg, HJ, Maybee JS (eds.), *Computer-Assisted Analysis and Model Simplification*, Academic Press, New York: 455–479.
- Greenberg HJ (1983) A Computer-Assisted Analysis System for Linear Programming Models, *ACM Transactions on Mathematical Software* 9:18–56.
- Greenberg HJ (1987a) Computer-Assisted Analysis for Diagnosing Infeasible or Unbounded Linear Programs, *Mathematical Programming Studies* 31:79–97.
- Greenberg HJ (1987b) Diagnosing Infeasibility in Min-cost Network Flow Problems; Part I: Dual Infeasibility, *IMA Journal of Mathematics in Management* 1:99–109.
- Greenberg HJ (1987c) The Development of an Intelligent Mathematical Programming System, *WORMSC Proceedings*, Washington, D.C., November.
- Greenberg HJ (1988) Diagnosing Infeasibility in Min-cost Network Flow Problems; Part II: Primal Infeasibility, *IMA Journal of Mathematics in Management* 2:39–50.
- Greenberg HJ (1991) An Industrial Consortium for the Development of an Intelligent Mathematical Programming System, *Interfaces* 20:88–93.
- Greenberg HJ (1992) An Empirical Analysis of Infeasibility Diagnosis for Instances of Linear Programming Blending Models, *IMA Journal of Mathematics in Business & Industry* 4:163–210.
- Greenberg HJ (1993) How to Analyze the Results of Linear Programs—Part 3: Infeasibility Diagnosis, *Interfaces* 23:120–139.
- Greenberg HJ (1993a) *A Computer-Assisted Analysis System for Mathematical Programming Models and Solutions: A User’s Guide for ANALYZE*, Kluwer Academic Publishers, Boston.
- Greenberg HJ (1996a) Consistency, Redundancy, and Implied Equalities in Linear Systems, *Annals of Mathematics and Artificial Intelligence* 17:37–83.
- Greenberg HJ (1996b) A bibliography for the development of an intelligent mathematical programming system, *Annals of Operations Research* 65:55–90
- Greenberg HJ (2003) *Mathematical Programming Glossary Supplement: Tolerances*, World Wide Web <http://glossary.computing.society.informs.org/notes/tolerances.pdf>.

- Greenberg HJ (2003a) *Mathematical Programming Glossary Supplement: Convex Cones, Sets, and Functions*, World Wide Web <http://glossary.computing.society.informs.org/notes/convexity.pdf>.
- Greenberg HJ, Murphy FH (1991) Approaches to Diagnosing Infeasibility for Linear Programs, *ORSA Journal on Computing* 3:253–261.
- Greenberg HJ, Pierskalla WP (1971) A Review of Quasi-Convex Functions, *Operations Research* 19:1553–1570.
- Guieu O, Chinneck JW (1999) Analyzing Infeasible Mixed-Integer and Integer Linear Programs, *INFORMS Journal on Computing* 11:63–77.
- Gupta P, Vlach M, Bhatia D (2004) Fuzzy Approximation to an Infeasible Generalized Linear Complementarity Problem, *Fuzzy Sets and Systems* 146:221–233.
- Han SP (1980) Least-squares solution of linear inequalities. Technical Report 2141, Mathematics Research Center, University of Wisconsin-Madison.
- Heath D, Kasif S, Salzburg S (1993) Learning Oblique Decision Trees, *Proceedings of the 13th International Conference on Artificial Intelligence*, Chambéry, France, Morgan Kaufmann, San Mateo, CA, 1002–1007.
- Hemery F, Lecoutre C, Sais L, Boussemart F (2006) Extracting MUCs from Constraint Networks, in *Proceedings of the 17th European Conference on Artificial Intelligence (ECAI'2006)*, 113–117.
- Holder A (2004) Radiotherapy Treatment Design and Linear Programming, *Operations Research and Health Care: A Handbook of Methods and Applications*, Brandeau ML, Sainfort F, Pierskalla WP (eds.), Chap. 29, Kluwer Academic Publishers.
- Holder A (2006) *Mathematical Programming Glossary*, INFORMS Computing Society, World Wide Web, <http://glossary.computing.society.informs.org/>.
- Holmström K, Göran AO, Edvall MM (2006) User's Guide for Tomlab/Xa V14, Tomlab Optimization Inc.
- Holzbaur C, Menezes F, Barahona P (1996) Defeasibility in CLP(Q) Through Generalized Slack Variables, *Principles and Practice of Constraint Programming-CP 96*, *Lecture Notes in Computer Science* 1118:209–223.
- Hoffman AJ (1960) Some Recent Applications of the Theory of Linear Inequalities to Extremal Combinatorial Analysis, *Proceedings of Symposia on Applied Mathematics* 10.
- Hooker JN (2007) *Integrated Methods for Optimization*, Springer Science+Business Media LLC, New York.
- Huitzing HA, Veldkamp BP, Verschoor AJ (2005) Infeasibility in Automated Test Assembly Models: A Comparison Study of Different Methods, *Journal of Educational Measurement* 42:223–243.
- Ibrahim W, Chinneck JW (2005) Improving Solver Success in Reaching Feasibility for Sets of Nonlinear Constraints, *Computers and Operations Research*, to appear (available online at www.sciencedirect.com).
- Ignizio JP, Cavalier TM (1994) *Linear Programming*, Prentice Hall, Englewood Cliffs.
- Ilog (2006) Cplex software, World Wide Web <http://www.ilog.com/products/cplex/>.
- John E, Yildirim EA (2006) Implementation of warm-start strategies in interior-point methods for linear programming in fixed dimension, *Computational Optimization and Applications*, to appear.
- Johnson EL, Nemhauser GL, Savelsbergh MWP (2000) Progress in Linear Programming-Based Algorithms for Integer Programming: An Exposition, *INFORMS Journal on Computing* 12:2–23.
- Jokar S, Pfetsch ME (2007) Exact and Approximate Sparse Solutions of Underdetermined Linear Equations, *Konrad-Zuse-Zentrum für Informationstechnik Berlin*, technical report 07–05.

- Jones DR, Schonlau M, Welch WJ (1998) Efficient global optimization of expensive black-box functions, *Journal of Global Optimization* 13:455–492.
- Juloski AL, Heemels WPMH, Ferrari-Trecate G, Vidal R, Paoletti S, Niessen JHG (2005) Comparison of Four Procedures for the Identification of Hybrid Systems, *Lecture Notes in Computer Science* 3414:354–369, Springer-Verlag, Berlin.
- Junker U (2001) Quickxplain: Conflict detection for arbitrary constraint propagation algorithms, in *IJCAI-2001 Workshop on Modeling and Solving Problems with Constraints*, 75–82.
- Kaczmarz S (1937) Angenäherte Auflösung von Systemen Linearer Gleichungen, *Bulletin de l'Académie Polonaise des Sciences et Lettres*, A35:355–357.
- Kirkpatrick S., Gelatt Jr. CD, Vecchi MP (1983) Optimization by Simulated Annealing, *Science* 220:671–680.
- Koene J (1982) Minimal Cost Flow in Processing Networks, a Primal Approach, *CWI Tract* 4.
- Kumar V (1992) Algorithms for Constraint-Satisfaction Problems: a Survey, *AI Magazine*, Spring 1992:32–44.
- Kurator WG, O'Neill RP (1980) PERUSE: An Interactive System for Mathematical Programs, *ACM Transactions on Mathematical Software* 6:489–509.
- Lagoudakis MG, Littman ML (2001) Learning to Select Branching Rules in the DPLL Procedure for Satisfiability, *Electronic Notes in Discrete Mathematics* 9, LICS 2001 Workshop on Theory and Applications of Satisfiability Testing (SAT 2001), Boston, MA, June 14–15, 2001.
- Laguna M, Martí R (2005) Experimental Testing of Advanced Scatter Search Designs for Global Optimization of Multimodal Functions, *Journal of Global Optimization* 33:235–255.
- Land AH, Doig AG (1960) An Automatic Method for Solving Discrete Programming Problems, *Econometrica* 28:497–520.
- Lasdon LS (1970) *Optimization Theory for Large Systems*, Macmillan Company, New York.
- Lasdon L, Plummer J (2006) Multistart Algorithms for Seeking Feasibility, *Computers and Operations Research*, to appear (available online now).
- Lasdon L, Plummer J, Ugray Z, Bussieck M (2004) Improved filters and randomized drivers for multi-start global optimization, *McCombs School of Business Research Paper Series No. IROM-06-06*, University of Texas at Austin.
- Lasdon L, Waren AD (1978) Generalized Reduced Gradient Software for Linearly and Nonlinearly Constrained Problems, in Greenberg HJ (ed.), *Design and Implementation of Optimization Software*, Sijthoff and Noordhoff.
- Lawrence CT, Tits AL (2001) A Computationally Efficient Feasible Sequential Quadratic Programming Algorithm, *SIAM Journal on Optimization* 11:1092–1118.
- Lee EK, Gallagher RJ, Zaider M (1999) Planning Implants of Radionuclides for the Treatment of Prostate Cancer: An Application of Mixed Integer Programming, *OPTIMA Mathematical Programming Society Newsletter* 61:1–7.
- León T, Liern V (2001) A Fuzzy Method to Repair Infeasibility in Linearly Constrained Problems, *Fuzzy Sets and Systems* 122:237–243.
- Liffiton MH, Sakallah KA (2005) On Finding All Minimally Unsatisfiable Subformulas, *Proceedings of the 8th International Conference on Theory and Applications of Satisfiability Testing (SAT-2005)*:173–186, June.
- Lim J, Ferris MC, Shepard DM, Wright SJ, Earl MA (2006) An Optimization Framework for Conformal Radiation Treatment Planning, *INFORMS Journal On Computing*, to appear.

- Linderoth JT, Savelsbergh MWP (1999) A computational study of search strategies for Mixed Integer Programming, *INFORMS Journal on Computing* 11:173–187.
- Lingo Systems Inc. (2007) LINGO, World Wide Web <http://www.lindo.com/products/lingo/lingom.html>.
- Lustig IJ, Puget JF (2001) Program Does Not Equal Program: Constraint Programming and its Relationship to Mathematical Programming, *Interfaces* 31:29–53.
- MacLeod M (2006) Multistart Constraint Consensus for Seeking Feasibility in Nonlinear Programs, MASC thesis, Systems and Computer Engineering, Carleton University, Ottawa, Canada.
- MacLeod M, Chinneck JW (2007) Multistart Constraint Consensus for Seeking Feasibility in Nonlinear Programs, technical report, Systems and Computer Engineering, Carleton University.
- Main RA (1993a) Infeasibility Analysis Using CLAUDIA–I, BP Oil International, Oil Technology Centre, technical report.
- Main RA (1993b) Infeasibility Analysis Using CLAUDIA–II. BP Oil International, Oil Technology Centre, technical report.
- Mammen DL, Hogg T (1997) A New Look at the Easy–Hard–Easy Pattern of Combinatorial Search Difficulty, *Journal of Artificial Intelligence Research* 7:47–66.
- Mangasarian OL (1993) Mathematical Programming in Neural Networks, *ORSA Journal on Computing* 5:349–360.
- Mangasarian OL (1994) Misclassification Minimization, *Journal of Global Optimization* 5:309–323.
- Mangasarian OL (1996) Machine Learning via Polyhedral Concave Minimization, *Applied Mathematics and Parallel Computing*, in Fischer H, Riedmueller B, Schaeffler S (eds.), *Physical–Verlag*:175–188.
- Mangasarian OL (1999) Minimum–Support Solutions of Polyhedral Concave Programs, *Optimization* 45:149–162.
- McCarl B (1998) Repairing Misbehaving Mathematical Programming Models: Concepts and a GAMS–Based Approach, *Interfaces* 28:124–138.
- Meller J, Wagner M, Elber R (2002) Maximum Feasibility Guideline to the Design and Analysis of Protein Folding Potentials, *Journal of Computational Chemistry* 23:111–118.
- Meneses CN, Pardalos PM, Resende MGC (2005) GRASP for nonlinear optimization, Technical Report TD–6DUTRG, AT&T Labs Research, Florham Park, NJ, June.
- Meseguer P, Bouhmala N, Bouzoubaa T, Irgens M, Sánchez M (2003) Current Approaches for Solving Over–Constrained Problems, *Constraints* 8:9–39.
- Mészáros Cs, Suhl UH (2003) Advanced Preprocessing Techniques for Linear and Quadratic Programming, *Operations Research Spectrum* 25:575–595.
- Michalewicz Z, Logan TD, Swaminathan S (1994) Evolutionary Operators for Continuous Convex Parameter Spaces, in *Proceedings of the 3rd Annual Conference on Evolutionary Programming*, Sebald AV, Fogel LJ (eds.), World Scientific Publishing, River Edge, NJ, 84–97.
- Michalewicz Z, Nazhiyath G (1995) Genocop III: a co–evolutionary algorithm for numerical optimization problems with nonlinear constraints, *IEEE International Conference on Evolutionary Computation* 1995, 2:647–651.
- Michalowski W, Szapiro T (1992) A Bi–reference Procedure for Interactive Multiple Criteria Programming, *Operations Research* 40:247–258.
- Miguel I (2001) Dynamic Flexible Constraint Satisfaction and Its Application to AI Planning, PhD Thesis, University of Edinburgh.
- Mitchell D, Selman B, Levesque H (1992) Hard and Easy Distributions of SAT Problems, *Proceedings of the 10th Annual Conference on Artificial Intelligence AAAI–92*:459–465.
- Mitra G, Tamiz M (1988) FortLP Reference Manual, NAG Ltd.

- Motzkin TS (1936) Beiträge zur Theorie der linearen Ungleichungen, Ph.D. thesis, Azriel, Jerusalem.
- Motzkin TS, Schoenberg JJ (1954) The Relaxation Method for Linear Inequalities, *Canadian Journal of Mathematics* 6:393–404.
- Murtagh BA, Saunders MA (1987) MINOS 5.1 User's Guide, technical report SOL 83–20R, Systems Optimization Laboratory, Department of Operations Research, Stanford University.
- Murthy S, Kasif S, Salzberg S (1994) A System for induction of oblique decision trees, *Journal of Artificial Intelligence Research* 2:1–32.
- Murty KG (1983) *Linear Programming*, John Wiley & Sons, New York.
- Murty KG, Kabadi SN, Chandrasekaran R (2000) Infeasibility Analysis for Linear Systems, a Survey, *Arabian Journal of Science and Technology* 25:3–18.
- Nadel A (2002) Backtrack Search Algorithms for Propositional Logic Satisfiability: Review and Innovations, master's thesis, Hebrew University of Jerusalem.
- Nazareth JL (1987) *Computer Solution of Linear Programs*, Oxford University Press, New York.
- Newman DJ, Hettich S, Blake CL, Merz CJ (1998) UCI Repository of machine learning databases [http://www.ics.uci.edu/~mlearn/MLRepository.html]. Irvine, CA: University of California, Department of Information and Computer Science.
- Nemhauser GL, Savelsbergh MWP, Sigismondi GC (1994) MINTO: a Mixed INTEger Optimizer, *Operations Research Letters* 15:47–58.
- Nemhauser GL, Wolsey LA (1988) *Integer and Combinatorial Optimization*, Wiley–Interscience Series in Discrete Mathematics and Optimization, John Wiley & Sons, New York.
- Obuchowska WT (1998) Infeasibility Analysis for Systems of Quadratic Convex Inequalities, *European Journal of Operational Research* 107:633–643.
- Obuchowska WT (1999) On Infeasibility of Systems of Convex Analytic Inequalities, *Journal of Mathematical Analysis and Applications* 234:223–245.
- Ordóñez F, Freund RM (2003) Computational Experience and the Explanatory Value of Condition Measures for Linear Optimization, *SIAM Journal on Optimization* 14:307–333.
- Padberg M (1999) *Linear Optimization and Extensions*, 2nd edition, Springer–Verlag.
- Pannell DJ (1997) *Introduction to Practical Linear Programming*, John Wiley and Sons Inc., New York.
- Pardalos PM (1994) On the Passage from Local to Global in Optimization, in Birge JR, Murty KG (eds.), *Mathematical Programming: State of the Art 1994*, The University of Michigan.
- Parker M (1995) A Set Covering Approach to Infeasibility Analysis of Linear Programming Problems and Related Issues, PhD thesis, University of Colorado at Denver.
- Parker M, Ryan J (1996) Finding the Minimum Weight IIS Cover of an Infeasible System of Linear Inequalities, *Annals of Mathematics and Artificial Intelligence* 17:107–126.
- Patel J, Chinneck JW (2006) Active–Constraint Variable Ordering for Faster Feasibility of Mixed Integer Linear Programs, *Mathematical Programming*, to appear.
- Petit T, Regim JC, Bessiere C (2000) Meta–Constraints on Violations for Over Constrained Problems, *Proceedings of the 12th IEEE International Conference on Tools with Artificial Intelligence 2000 (ICTAI 2000)*:358–365
- Pfetsch ME (2002) The Maximum Feasible Subsystem Problem and Vertex–Facet Incidences of Polyhedra, PhD thesis, Dept. of Mathematics, Technischen Universität Berlin.
- Pfetsch ME (2005) Branch–and–Cut for the Maximum Feasible Subsystem Problem, ZIB Report 05–46, Konrad–Zuse–Zentrum für Informationstechnik Berlin.

- Pintér JD (1998) Continuous global optimization: An introduction to models, solution approaches, tests and applications, *Interactive Transactions of ORMS 2*, World Wide Web <http://catt.bus.okstate.edu/itorms/pinter/>.
- Popescu E (2001) Use of the Interior-Point Method for Correcting and Solving Inconsistent Linear Inequality Systems, *Analele Stiințifice ale Universității "Ovidius" Constanța, Seria Matematică* 9:65–72.
- Press WH, Teukolsky SA, Vetterling WT, Flannery BP (1992) *Numerical Recipes in C: The Art of Scientific Computing*, Second Edition, Cambridge University Press, Cambridge.
- Rardin RL (1998) *Optimization in Operations Research*, Prentice Hall, Upper Saddle River, New Jersey.
- Renegar J (1994) Some Perturbation Theory for Linear Programming, *Mathematical Programming* 65:73–91.
- Resende MGC, Ribeiro CC (2003a) Greedy randomized adaptive search procedures, in Glover FW, Kochenberger G (eds.), *Handbook of Metaheuristics*, International Series in Operations Research and Management Science 57:219–249, Kluwer Academic Publishers, Boston.
- Resende MGC, Ribeiro CC (2003b) GRASP with path-relinking: Recent advances and applications, Technical Report TD-5TU726, AT&T Labs Research, December.
- Riera-Ledesma J, Salazar-Gonzalez JJ (2007) A Branch-and-Cut Algorithm for the Continuous Error Localization Problem in Data Cleaning, *Computers and Operations Research* 34:2790–2804.
- Rosenthal R (2007) GAMS — A User's Guide, GAMS Development Corporation, Washington, D.C., World Wide Web <http://www.gams.com/docs/gams/GAMSUsersGuide.pdf>.
- Roodman GM (1979) Post-Infeasibility Analysis in Linear Programming, *Management Science* 25:916–922.
- Russell S, Norvig P (2002) *Artificial Intelligence, A Modern Approach*, Second Edition, Prentice Hall.
- Sadegh P (1999) A Maximum Feasible Subset Algorithm with Application to Radiation Therapy, *Proceedings of the American Control Conference*, San Diego, California: 405–408.
- Sahinidis NV (1996) BARON: A general purpose global optimization software package, *Journal of Global Optimization* 8:201–205.
- Sahinidis NV (2000) BARON: Brand and Reduce Optimization Navigator User's Manual, Version 4.0.
- Sandholm T, Shields R (2006) Nogood Learning for Mixed Integer Programming, CMU Computer Science Department technical report CMU-CS-06-155.
- Sankaran JK (1993) A Note on Resolving Infeasibility in Linear Programs by Constraint Relaxation, *Operations Research Letters* 13:19–20.
- Savelsbergh MWP (1994) Preprocessing and Probing Techniques for Mixed Integer Programming Problems, *ORSA Journal on Computing* 6:445–454.
- Sepulveda AE, Epstein L (1996) The repulsion algorithm, a new multistart method for global optimization, *Structural and Multidisciplinary Optimization* 11:145–152.
- Schrage L (1991) LINDO: An Optimization Modeling System 4th edition, The Scientific Press, San Francisco.
- Schrage L (1997) *Optimization Modeling with LINDO*, Duxbury Press.
- Sherali HD, Tuncbilek CH (1992) A Global Optimization Algorithm for Polynomial Programming Problems using a Reformulation-Linearization Technique, *Journal of Global Optimization* 2:101–112.
- Smith S, Lasdon L (1992) Solving Large Sparse Nonlinear Programs Using GRG, *ORSA Journal on Computing* 4:2–15.

- Steuer RE (1986) *Multiple Criteria Optimization: Theory, Computation and Application*, Wiley, New York.
- Steuer RE, Schuler AT (1981) *Interactive Multiple Objective Linear Programming Applied to Multiple Use Forestry Planning*, publication FWS-1-81, School of Forestry and Wildlife Resources, Virginia Polytechnic Institute and State University.
- Tamiz M, Mardle SJ, Jones DF (1995) *Resolving Inconsistency in Infeasible Linear Programmes*, technical report, School of Mathematical Studies, University of Portsmouth, U.K.
- Tamiz M, Mardle SJ, Jones DF (1996) Detecting IIS in Infeasible Linear Programmes using Techniques from Goal Programming, *Computers and Operations Research* 23:113-119.
- Timminga E (1998) Solving Infeasibility in Computerized Test Assembly, *Applied Psychological Measurement* 22:280-291.
- Tsoi AC, Hagenbucher M, Scarselli F (2006) Computing Customized Page Ranks, *ACM Transactions on Internet Technology* 6:381-414.
- Tu W, Mayne RW (2002a) An approach to multi-start clustering for global optimization with non-linear constraints, *International Journal for Numerical Methods in Engineering* 53:2253-2269.
- Tu W, Mayne RW (2002b) Studies of multi-start clustering for global optimization, *International Journal for Numerical Methods in Engineering* 53:2239-2252.
- Ugray Z, Lasdon L, Plummer J, Glover F, Kelly J, Martí R (2006) Scatter Search and Local NLP Solvers: A Multistart Framework for Global Optimization, *INFORMS Journal on Computing*, to appear.
- Van Hentenryck P (1999) *The OPL Optimization Programming Language*, MIT Press, Cambridge, Massachusetts.
- van Loon J (1981) Irreducibly Inconsistent Systems of Linear Inequalities, *European Journal of Operations Research* 8:283-288.
- Vatolin AA (1992) An LP-Based Algorithm for the Correction of Inconsistent Linear Equation and Inequality Systems, *Optimization* 24:157-164.
- Vera JR (1998) On the Complexity of Linear Programming Under Finite Precision Arithmetic, *Mathematical Programming* 80:91-123.
- Wagner M, Meller J, Elber R (2004) Large-Scale Linear Programming Techniques for the Design of Protein Folding Potentials, *Mathematical Programming* 101:301-318.
- Williams HP (1978) *Model Building in Mathematical Programming*, John Wiley and Sons, Chichester.
- Winston WL, Venkataramanan M (2003) *Introduction to mathematical programming*, 4th edition. Brooks/Cole, Pacific Grove, USA.
- Wolfe P (1965) The Composite Simplex Method, *SIAM Review* 7:42-54.
- Wright, SJ (1997) *Primal-Dual Interior-Point Methods*, SIAM Publications.
- Wu X, Barabá D (2002) Learning Missing Values from Summary Constraints, *ACM SIGKDD Explorations Newsletter* 4:21-30.
- Xiao Y, Censor Y, Michalski D, Galvin J (2003) The Least-Intensity Feasible Solution for Aperture-Based Inverse Planning in Radiation Therapy. *Annals of Operations Research* 119:183-203.
- Yang J (2006) Infeasibility Resolution Based on Goal Programming, *Computers and Operations Research*, to appear (available online now).
- Yarnold PR, Soltysik RC (2004) *Optimal Data Analysis: a Guidebook with Software for Windows*, American Psychological Association.
- Yildirim EA, Wright SJ (2002) Warm-Start Strategies in Interior-Point Methods for Linear Programming, *SIAM Journal on Optimization* 12:782-810.

- You Z (1993) Localization and Diagnosis of Structural Problems in Petri Net Models, MSc thesis, Systems and Computer Engineering, Carleton University, Ottawa, Canada.
- Zionts S, Wallenius J (1983) An Interactive Multiple Objective Linear Programming Method for a Class of Underlying Nonlinear Utility Functions, *Management Science* 29:519–529.

Index

A

Active constraints method, 37–42
Additive adaptive grouping, 104
Additive method, 98–101, 104, 106,
109–110, 119, 124, 126, 129, 132,
134–137, 140–143, 144, 149, 153,
154, 155–157, 165–167
Additive/deletion method, 109, 110, 120,
137, 140–143
Additive/sensitivity method, 119, 120
Adjusting the constraint matrix, 206–208
Advanced start, 17, 18, 23, 109, 112, 149,
156, 170, 175, 176
Affine-scaling method, 65, 199
Algorithm 2(k), 174, 175
Algorithm 3(k), 175
Alldiff, 46
Almost convex region effect, 57, 58
Alpha-shape technique, 60
Altering constraints, 197
AMPL, 54, 76, 96, 180, 230
ANALYZE, 90, 127, 128, 130, 131
Analyzing infeasibility, 7, 25, 89–209, 213
Approximating LP, 205, 206
Arc consistency, 47, 195
Artificial variables, 11–13, 16, 17, 101,
114, 115, 124, 167, 168, 198, 201, 202
Automated test assembly, 212, 238–239
Average direction-based constraint
consensus, 69

B

Back jumping, 195
Backtracking, 43, 46–49, 118, 131, 156,
190–192, 212, 240, 241
BARON, 87
Basis pursuit, 243, 244
Basis reduction, 43, 44
Best approximation problem, 209
Big-M method, 11, 13, 181, 230, 237
Bilinear relationship, 163
Binary constraint, 47

Binary integer program, 193
Binary program, 25, 27–29, 130, 238, 242
Bootstrapping, 52, 59, 60, 62, 85, 87, 88,
144, 184
Bound tightening, 10, 75, 76, 95, 96, 130,
131
Branch and bound, 8, 17, 23–24, 44,
130–133, 138–144, 167, 195, 208,
212, 230, 232, 240–241
Branch and cut, 23, 24, 28, 30, 130, 180,
230, 232
Branch down, 24
Branch up, 24
Branching variable selection, 24, 37, 139,
140
Bregman distance, 200
Buffer overrun detection, 239

C

Candidate variable, 15, 23, 24, 37–40
Check inequality, 205
CLAUDIA, 128, 129
Closed hemisphere problem, 231
Column protection, 122, 125
Combinatorial Bender's cuts, 167, 180,
183
Combining methods, 118
Complementary inequalities, 189–192
Complete inconsistency, 232
Component averaging, 20, 21, 66
Composite objective, 18
Concave function, 55–57
Conflict analysis, 42–43
Conflict constraints, 42, 43
Conflict-directed backtracking, 48
Conflict refiner, 129, 143
Conflict set, 43, 48, 143, 156, 220, 240
Consensus vector, 4, 19–21, 66, 67, 69,
71, 81
Constrained region, 57, 58, 60, 62
Constraint consensus, 19, 65–73, 77, 80,
81, 83, 84

- Constraint effectiveness, 59, 111
 Constraint learning, 42, 48
 Constraint logic programming, 45, 156
 Constraint programming, 42, 45–50, 96, 98, 154, 156, 157, 193, 195, 212, 240
 Constraint propagation, 46, 47, 96
 Constraint satisfaction problem, 45, 46, 48, 49, 156, 157, 193, 195
 Constraint sensitivity, 173, 174
 Constraint shifting, 197–199, 202, 204–205
 Constraint violation, 2, 3, 19, 23, 51, 52, 58, 80, 148, 149, 167, 168, 172–174, 199, 240
 Constructive method, 156
 Control row, 128, 129
 Control sequence, 19, 20
 Convex function, 9, 54–56
 Convexify, 8, 9
 Convex region effect, 57–60, 62
 Convex sampling enclosure, 58–60, 75
 Convex set, 19, 36, 51, 54, 56–58, 206
 Cplex, 32, 34, 37, 40–42, 113, 129, 143, 168, 169, 177, 178, 183, 199, 230, 238
 Crash start, 11, 15, 16
 Crossover from an infeasible basis, 16, 17
 CSADT, 229
 CUTE, 64, 77
- D**
- Data analysis, 227–233
 Data classification, 227, 231
 Data depth, 211, 227, 231, 232
 Davis-Putnam-Logemann-Loveland algorithm, 49
 DBavg constraint consensus, 69
 DBbound constraint consensus, 71, 72
 DBmax constraint consensus, 70, 71
 Debug command, 129
 Degree heuristic, 46
 Deletion filter, 43, 97–98, 104–110, 112, 118–122, 123–126, 128–129, 132–134, 137, 140–143, 144–146, 149–153, 154, 156–157, 160, 167, 238
 Deletion/sensitivity filter, 118–122, 125, 129, 150, 160
 Depth first binary search filter (DFBS), 105–107, 109, 142
 Destructive method, 156
 Diagnosis of over determined constraint satisfaction problems (DOC), 156
- Dichotomic method, 156
 Digital video broadcasting, 180, 181, 183, 212, 235, 237
 Disciplined convex optimization, 58
 Discriminant analysis, 183
 Distance to ill-posedness, 208
 Dom/Wdeg, 156
 Dr. AMPL, 54
 Duality gap, 5
 Dubious constraint, 133, 134, 137, 141
 Dynamic reordering additive method, 100, 136, 141
- E**
- Easy-hard-easy pattern, 7
 Efficient global optimization (EGO), 78
 Elastic filter, 101–104, 108, 112, 120, 122, 125, 126, 128, 129, 144, 239
 Elastic programming, 102, 105, 172, 198, 199
 Elastic SINf, 169–171, 175
 Elastic variable, 98, 101, 102, 114, 115, 122, 167, 168, 171–174, 178, 198–200, 202, 204, 205, 238
 Enforcing a constraint, 102, 125
 Equilibrium constraints, 162, 163
 Errors in massive data sets, 211, 232, 233
 Exact penalty function, 80
 Extreme aspiration level, 220–222, 225
- F**
- Fail-first heuristic, 46
 FDfar algorithm, 68, 69
 FDnear algorithm, 68, 69
 Feasibility-distance based constraint consensus, 68
 Feasibility distance tolerance, 67–70, 72, 84
 Feasibility pump, 30–36
 Feasibility vector, 4, 19–21, 66–72, 83, 84
 Feasible sequential quadratic programming, 51
 Forcing substructure, 213
 FortMP, 15–17
 Forward checking, 47, 195
 Frequency-based heuristic, 165
 Frobenius norm, 207, 208
 Frontline systems solvers, 130, 154
 Full elastic program, 168, 172, 173, 199
 Function tolerance test, 3
 Fuzzy sets, 202

G

GAMS, 8
 Generalized binary search filter (GBS), 107–109, 142
 Generalized network, 214, 215
 Generalized reduced gradient algorithm (GRG), 51, 65
 Genetic algorithm, 60, 78
 Global optimization, 52, 78, 79, 87–88, 153, 154, 162, 208
 Goal programming, 98, 199, 202, 203, 238
 GPIIS, 98
 Gradient projection, 66
 GRASP, 78
 Greedy unit propagation (GUP), 50
 Grouping constraints, 149, 157
 Grow method, 160
 Guard constraints, 145, 146
 Guide codes, 121, 122, 129, 221, 223–225
 Guiding the isolation, 120–122, 143

H

Half space depth, 231
 Hard constraint, 195, 217, 218, 220, 223, 225
 Hard objective, 217, 220, 223
 Hemisphere problem, 231, 245
 Hill-climbing, 48
 Hit-and-run methods, 59–62, 75
 Hyperslab, 189, 242

I

IIS cover, 159–161, 164, 166–171, 175–178, 184–190, 227, 228, 231, 232
 IIS enumeration, 164, 165
 IIS pivoting, 117, 157
 Implied equality, 59, 111, 152
 Incumbent solution, 7, 24, 25, 180, 230, 237
 Infeasible due to mathematical error, 145, 146
 Infeasible in the ordinary sense, 145, 146
 Infeasible network LP, 127, 128
 Infeasible subset, 48, 88–90, 93, 132–139, 141–143, 154, 240
 Infeasible-path interior point methods, 11

Initial point placement, 63–65, 76, 77
 Integer and randomized deletion algorithm (IRDA), 238
 Integer infeasibility, 4, 5, 26, 32
 Intelligent backtracking, 43, 48, 156, 240, 241
 Intelligent Mathematical Programming System (IMPS), 90
 Intensity-Modulated Radiation Therapy (IMRT), 235, 236
 Interaction analysis, 217, 218, 223
 Interior point heuristic, 183, 184, 237
 Interior point methods, 11, 18, 65, 112, 118
 Irreducible infeasible subset of constraints (IIS), 42, 48, 85–90, 93, 94, 96–106
 Isolating infeasibility, 93–157

J

Jeroslaw-Wang branching heuristic, 49, 50

K

k-consistency, 47
 killing constraint, 152, 153
 knapsack cover, 241

L

L1 norm, 31, 203, 204, 206, 207
 Least constraining value heuristic, 47
 Least-squares, 199, 200
 LINDO, 129, 143, 154, 185, 213
 Linear program, 2, 11–21, 45, 90, 93–95, 101, 112–130, 159–209, 213, 216–226, 228–232, 235–236
 Linear program with equilibrium constraints (LPEC), 162, 179, 180, 229
 l -infinity norm, 199
 LINGO, 143, 154
 Local search, 25, 46, 48, 78, 79, 183
 Location depth, 231
 Logarithmic barrier function, 61, 62
 Logic programming, 45, 155, 156
 Logical reduction, 95, 96, 127
 LP. *See* Linear program
 LP relaxation, 23–28, 30–33, 37, 38, 131, 132, 134, 138, 140, 141, 166, 167, 238
 LSGRG(MIS), 147, 149, 154

M

Machine learning, 160, 162, 180, 181, 227, 228
 Maintaining Arc Consistency (MAC), 47
 Mams branching heuristic, 49, 50
 Marker point, 81–84
 Market split problems, 43, 44
 Max independent set problem, 245
 Maximum feasibility guideline algorithm, 184
 Maximum feasible subsystem problem (MAX FS), 89, 159–195, 198, 211, 212, 227, 228, 231, 232, 236, 237, 240, 243–245
 Maximum satisfiability problem (MAXSAT), 49, 187, 189, 193, 245
 MAXO branching heuristic, 49, 50
 Measuring infeasibility, 2–5
 Method of feasible directions, 65
 Min-conflicts heuristic, 48
 Minimal conflict set, 48, 156, 240
 Minimal cover, 172, 187
 Minimal infeasible system, 189
 Minimal intractable subsystem (MIS), 90, 145, 147
 Minimal unbounded set of variables, 213
 Minimal unsatisfiable core, 156
 Minimally unsatisfiable subformula (MUS), 154, 155
 Minimum feedback arc set problem, 244
 Minimum misclassification cardinality, 227
 Minimum number of feasible partitions problem (MIN PFS), 189–193
 Minimum remaining values heuristic, 46
 Minimum unsatisfied linear relation problem (MIN ULR), 159
 Minimum-cardinality IIS set-covering problem (MIN IIS COVER), 159–161, 164, 227, 228, 231
 Minimum-weight IIS cover, 171
 MINLP. *See* Mixed-integer nonlinear program
 MINOS(IIS), 121, 122, 124, 128–130
 MINOS, 18, 63
 MINTO, 131
 MIP. *See* Mixed-integer linear program
 MISMIN, 229
 Mixed-integer linear program (MIP or MILP), 2, 23–44, 96, 102, 104–105,

130–143, 157, 161, 166–167, 179–180, 183, 236, 237, 242

Mixed-integer nonlinear program (MINLP), 34–36
 Mixed-integer program (MIP), *See* Mixed-integer linear program
 MOMS branching heuristic, 49, 50
 Most violated constraint control, 20
 Movement tolerance, 67–70, 72
 MProbe, 55, 56, 59, 61, 73, 75, 76, 90, 111
 MSNLP, 79, 80, 83
 Multi-objective program, 195, 202, 203, 238
 Multiple constraint, 86, 202
 Multiple-objective linear program (MOLP), 216–226
 Multiplicative adaptive grouping, 104, 105
 Multistart constraint consensus, 80–84
 Multistart methods, 73, 77–79, 87
 Mutually incompatible constraints (MIC), 129

N

Necessary constraint, 62, 199
 Netlib, 112, 113, 166, 175
 Neural networks, 227–231
 Node selection, 24, 46, 140
 Nogood learning, 42, 48
 Nonbasic variable, 13, 14, 16, 17, 25–27, 116
 Nonconserving processing network, 214, 215
 Nonconvex region effect, 57–59
 Nonlinear program (NLP), 2, 34, 51, 144, 204
 Nonlinear range cutting, 75
 Nonlinear turnabout, 86
 Nontermination, 130, 132
 Nonviability, 214–216
 NP-hard, 159, 161, 212, 240, 244–245
 Nucleus box, 74, 75
 Number of infeasibilities (NINF), 3, 14, 67, 167

O

Objective interference, 221–223, 225
 Oblique projection, 20
 OC1, 229
 OCTANE, 28–30
 Open hemisphere problem, 231

- OPL, 45
 Optimal data analysis, 231
 Optimality gap, 32, 41
 OptQuest, 78
 Orthogonal projection, 4, 19–21, 66
 OSL, 129
 Overconstrained problem, 193, 195
 Overlapped IISs, 119, 185
- P**
 Page ranking, 239, 240
 Partial constraint satisfaction, 193–195
 Partial inconsistency, 232
 Path-consistent, 47
 Penalty function, 51–53, 80, 145
 PERUSE, 90
 Petri net, 216
 Phase 1 algorithm, 11, 12
 Phase 1 heuristics, 167–169
 Phase 2 algorithm, 174, 175, 177, 229
 Piecewise affine autoregressive
 exogenous (PWARX), 193
 Piecewise linear model estimation,
 242, 243
 Pivot-and-complement, 25–28
 Pivot-and-shift, 25–28
 Pivoting methods, 116–118
 Pointer, 82–84
 Posynomial function, 9
 PREDUCE, 55
 Preference constraint, 46
 Presolving, 47, 75, 95, 96
 Primal-dual interior point methods, 18
 Prime analytic centre, 61
 Processing node, 214, 216
 PROFLOW, 129
 Projection methods, 19–21
 Propagation, 47, 50
 Protein folding, 183, 236, 237
 Pseudo-costs, 37
 Pure network, 214
 Pure processing network, 214, 215
 Purify algorithm, 17
 Push algorithm, 17
- Q**
 Quadratic program, 14, 151–153, 204
 Quadratically-constrained quadratic
 program (QCP, QCQP), 14, 150, 151,
 153
- R**
 Radiation treatment planning, 235, 236
 Random sampling, 58, 73
 Random walks, 48
 Randomized standard heuristic, 63–65
 Randomized thermal relaxation algorithm
 (RTR), 181–183
 Ratio equation, 214
 Reciprocal filter, 113
 Refinery and Petrochemical Modeling
 System, 90
 REFORM, 8
 Reformulation, 8–10
 Relaxation method, 21
 Relaxation parameter, 20
 Relaxation-induced neighbourhood search
 (RINS), 25
 Relaxed and ordered deletion algorithm
 (RODA), 238
 Remotest set control, 20, 69
 Reverse deletion filter, 124–126, 156
 Root node, 24, 32, 38
 Row aggregation, 130
- S**
 Sampling box, 73, 74, 76–78, 83
 Sampling enclosure, 55, 57–60
 Sampling methods, 110, 111
 Satisfiability problem (SAT), 49, 240, 241
 Scaling, 3, 4, 9, 71, 162, 242
 Scatter search, 78
 Selective unit propagation (SUP), 50
 Sensitivity filter, 114–116, 119, 126, 129,
 138, 160
 Sequential linear approximation, 163
 Sequential projection, 19, 181
 Sequential quadratic programming (SQP),
 204, 205
 Set covering, 110, 112, 164–166, 238
 Set covering and item sampling (SCIS),
 238
 Shifting constraints, 197–206
 Simple phase 1, 168, 170
 Simulated annealing, 48, 182
 Simultaneous projection, 20
 SINF-reduction heuristic, 169–178
 Single-start methods, 73, 77
 Small-cardinality IIS, 116
 Soft constraint, 195, 217–220, 223
 Soft objective, 217, 220, 223

Space-covering global optimizers, 153
Spanning line segment, 59, 63, 75
Sparse solutions to systems of linear equations, 243, 244
Special ordered sets, 37
Stand-and-hit algorithm, 59
Standard elastic program, 168–170
Standard heuristic, 63–65, 77, 83
Stochastic local search, 48
Strictly complementary partition, 118
Strong branching, 37
Structural infeasibility, 87
Structural relationships, 214
Successive overrelaxation, 17
Sufficient constraint, 134, 185
Sum of the infeasibilities (SINF), 3, 14, 15, 18, 167, 182
Superbasic variable, 17
Surface of maximal intersection, 85
Surrogate constraints, 37

T

Tabu search, 48
Tightening variable bounds, 9, 73–76
Tolerances, 3, 5, 90, 94, 144
Tree-structured search, 212, 240
True MOLP, 219, 223–225
Tukey depth, 231
Tukey median, 231
Two-phase method, 11, 13, 180, 181
Two-phase relaxation-based heuristic, 179–181

Type 1 pivot, 25–28
Type 2 pivot, 26–28
Type 3 pivot, 26–28

U

Unary constraint, 46
Unbounded linear program, 213–216
Undecidable point, 192–194
Underdetermined system, 243
Unit basis, 15
Unit propagation (UP), 50
Useful isolation, 122–127

V

Viability, 213–215
Voting heuristics, 20
Voxel, 235, 236

W

Warm start, 17, 18
Wcore, 156, 157
Weighted random multistart, 81
Witness nodes, 128

X

XA, 130
Xpress, 28, 34, 129

Z

Zooming and domain elimination, 79

**Early Titles in the
INTERNATIONAL SERIES IN
OPERATIONS RESEARCH & MANAGEMENT SCIENCE**

Frederick S. Hillier, Series Editor, Stanford University

- Saigal/ *A MODERN APPROACH TO LINEAR PROGRAMMING*
Nagurney/ *PROJECTED DYNAMICAL SYSTEMS & VARIATIONAL INEQUALITIES WITH APPLICATIONS*
Padberg & Rijal/ *LOCATION, SCHEDULING, DESIGN AND INTEGER PROGRAMMING*
Vanderbei/ *LINEAR PROGRAMMING*
Jaiswal/ *MILITARY OPERATIONS RESEARCH*
Gal & Greenberg/ *ADVANCES IN SENSITIVITY ANALYSIS & PARAMETRIC PROGRAMMING*
Prabhu/ *FOUNDATIONS OF QUEUEING THEORY*
Fang, Rajasekera & Tsao/ *ENTROPY OPTIMIZATION & MATHEMATICAL PROGRAMMING*
Yu/ *OR IN THE AIRLINE INDUSTRY*
Ho & Tang/ *PRODUCT VARIETY MANAGEMENT*
El-Taha & Stidham/ *SAMPLE-PATH ANALYSIS OF QUEUEING SYSTEMS*
Miettinen/ *NONLINEAR MULTIOBJECTIVE OPTIMIZATION*
Chao & Huntington/ *DESIGNING COMPETITIVE ELECTRICITY MARKETS*
Weglarz/ *PROJECT SCHEDULING: RECENT TRENDS & RESULTS*
Sahin & Polatoglu/ *QUALITY, WARRANTY AND PREVENTIVE MAINTENANCE*
Tavares/ *ADVANCES MODELS FOR PROJECT MANAGEMENT*
Tayur, Ganeshan & Magazine/ *QUANTITATIVE MODELS FOR SUPPLY CHAIN MANAGEMENT*
Weyant, J./ *ENERGY AND ENVIRONMENTAL POLICY MODELING*
Shanthikumar, J.G. & Sumita, U./ *APPLIED PROBABILITY AND STOCHASTIC PROCESSES*
Liu, B. & Esogbue, A.O./ *DECISION CRITERIA AND OPTIMAL INVENTORY PROCESSES*
Gal, T., Stewart, T.J., Hanne, T. / *MULTICRITERIA DECISION MAKING: Advances in MCDM Models, Algorithms, Theory, and Applications*
Fox, B.L. / *STRATEGIES FOR QUASI-MONTE CARLO*
Hall, R.W. / *HANDBOOK OF TRANSPORTATION SCIENCE*
Grassman, W.K. / *COMPUTATIONAL PROBABILITY*
Pomeroy, J.-C. & Barba-Romero, S. / *MULTICRITERION DECISION IN MANAGEMENT*
Axsäter, S. / *INVENTORY CONTROL*
Wolkowicz, H., Saigal, R., & Vandenberghe, L. / *HANDBOOK OF SEMI-DEFINITE PROGRAMMING: Theory, Algorithms, and Applications*
Hobbs, B.F. & Meier, P. / *ENERGY DECISIONS AND THE ENVIRONMENT: A Guide to the Use of Multicriteria Methods*
Dar-El, E. / *HUMAN LEARNING: From Learning Curves to Learning Organizations*
Armstrong, J.S. / *PRINCIPLES OF FORECASTING: A Handbook for Researchers and Practitioners*
Balsamo, S., Personé, V., & Onvural, R./ *ANALYSIS OF QUEUEING NETWORKS WITH BLOCKING*
Bouysson, D. et al. / *EVALUATION AND DECISION MODELS: A Critical Perspective*
Hanne, T. / *INTELLIGENT STRATEGIES FOR META MULTIPLE CRITERIA DECISION MAKING*
Saaty, T. & Vargas, L. / *MODELS, METHODS, CONCEPTS and APPLICATIONS OF THE ANALYTIC HIERARCHY PROCESS*
Chatterjee, K. & Samuelson, W. / *GAME THEORY AND BUSINESS APPLICATIONS*
Hobbs, B. et al. / *THE NEXT GENERATION OF ELECTRIC POWER UNIT COMMITMENT MODELS*
Vanderbei, R.J. / *LINEAR PROGRAMMING: Foundations and Extensions, 2nd Ed.*
Kimms, A. / *MATHEMATICAL PROGRAMMING AND FINANCIAL OBJECTIVES FOR SCHEDULING PROJECTS*
Baptiste, P., Le Pape, C. & Nuijten, W. / *CONSTRAINT-BASED SCHEDULING*
Feinberg, E. & Shwartz, A. / *HANDBOOK OF MARKOV DECISION PROCESSES: Methods and Applications*
Ramik, J. & Vlach, M. / *GENERALIZED CONCAVITY IN FUZZY OPTIMIZATION AND DECISION ANALYSIS*
Song, J. & Yao, D. / *SUPPLY CHAIN STRUCTURES: Coordination, Information and Optimization*
Kozan, E. & Ohuchi, A. / *OPERATIONS RESEARCH/ MANAGEMENT SCIENCE AT WORK*

**Early Titles in the
INTERNATIONAL SERIES IN
OPERATIONS RESEARCH & MANAGEMENT SCIENCE**

(Continued)

- Bouyssou et al. / *AIDING DECISIONS WITH MULTIPLE CRITERIA: Essays in Honor of Bernard Roy*
- Cox, Louis Anthony, Jr. / *RISK ANALYSIS: Foundations, Models and Methods*
- Dror, M., L'Ecuyer, P. & Szidarovszky, F. / *MODELING UNCERTAINTY: An Examination of Stochastic Theory, Methods, and Applications*
- Dokuchaev, N. / *DYNAMIC PORTFOLIO STRATEGIES: Quantitative Methods and Empirical Rules for Incomplete Information*
- Sarker, R., Mohammadian, M. & Yao, X. / *EVOLUTIONARY OPTIMIZATION*
- Demeulemeester, R. & Herroelen, W. / *PROJECT SCHEDULING: A Research Handbook*
- Gazis, D.C. / *TRAFFIC THEORY*
- Zhu/ *QUANTITATIVE MODELS FOR PERFORMANCE EVALUATION AND BENCHMARKING*
- Ehrgott & Gandibleux/ *MULTIPLE CRITERIA OPTIMIZATION: State of the Art Annotated Bibliographical Surveys*
- Bienstock/ *Potential Function Methods for Approx. Solving Linear Programming Problems*
- Matsatsinis & Siskos/ *INTELLIGENT SUPPORT SYSTEMS FOR MARKETING DECISIONS*
- Alpern & Gal/ *THE THEORY OF SEARCH GAMES AND RENDEZVOUS*
- Hall/ *HANDBOOK OF TRANSPORTATION SCIENCE - 2nd Ed.*
- Glover & Kochenberger/ *HANDBOOK OF METAHEURISTICS*
- Graves & Ringuest/ *MODELS AND METHODS FOR PROJECT SELECTION: Concepts from Management Science, Finance and Information Technology*
- Hassin & Haviv/ *TO QUEUE OR NOT TO QUEUE: Equilibrium Behavior in Queueing Systems*
- Gershwin et al/ *ANALYSIS & MODELING OF MANUFACTURING SYSTEMS*
- Maros/ *COMPUTATIONAL TECHNIQUES OF THE SIMPLEX METHOD*
- Harrison, Lee & Neale/ *THE PRACTICE OF SUPPLY CHAIN MANAGEMENT: Where Theory and Application Converge*
- Shanthikumar, Yao & Zijm/ *STOCHASTIC MODELING AND OPTIMIZATION OF MANUFACTURING SYSTEMS AND SUPPLY CHAINS*
- Nabrzyski, Schopf & Węglarz/ *GRID RESOURCE MANAGEMENT: State of the Art and Future Trends*
- Thissen & Herder/ *CRITICAL INFRASTRUCTURES: State of the Art in Research and Application*
- Carlsson, Fedrizzi, & Fullér/ *FUZZY LOGIC IN MANAGEMENT*
- Soyer, Mazzuchi & Singpurwalla/ *MATHEMATICAL RELIABILITY: An Expository Perspective*
- Chakravarty & Eliashberg/ *MANAGING BUSINESS INTERFACES: Marketing, Engineering, and Manufacturing Perspectives*
- Talluri & van Ryzin/ *THE THEORY AND PRACTICE OF REVENUE MANAGEMENT*
- Kavadias & Loch/ *PROJECT SELECTION UNDER UNCERTAINTY: Dynamically Allocating Resources to Maximize Value*
- Brandeau, Sainfort & Pierskalla/ *OPERATIONS RESEARCH AND HEALTH CARE: A Handbook of Methods and Applications*
- Cooper, Seiford & Zhu/ *HANDBOOK OF DATA ENVELOPMENT ANALYSIS: Models and Methods*
- Luenberger/ *LINEAR AND NONLINEAR PROGRAMMING, 2nd Ed.*
- Sherbrooke/ *OPTIMAL INVENTORY MODELING OF SYSTEMS: Multi-Echelon Techniques, Second Edition*
- Chu, Leung, Hui & Cheung/ *4th PARTY CYBER LOGISTICS FOR AIR CARGO*
- Simchi-Levi, Wu & Shen/ *HANDBOOK OF QUANTITATIVE SUPPLY CHAIN ANALYSIS: Modeling in the E-Business Era*
- Gass & Assad/ *AN ANNOTATED TIMELINE OF OPERATIONS RESEARCH: An Informal History*
- Greenberg/ *TUTORIALS ON EMERGING METHODOLOGIES AND APPLICATIONS IN OPERATIONS RESEARCH*
- Weber/ *UNCERTAINTY IN THE ELECTRIC POWER INDUSTRY: Methods and Models for Decision Support*
- Figueira, Greco & Ehrgott/ *MULTIPLE CRITERIA DECISION ANALYSIS: State of the Art Surveys*

Early Titles in the
INTERNATIONAL SERIES IN
OPERATIONS RESEARCH & MANAGEMENT SCIENCE

(Continued)

Reveliotis/ *REAL-TIME MANAGEMENT OF RESOURCE ALLOCATIONS SYSTEMS: A Discrete Event Systems Approach*

Kall & Mayer/ *STOCHASTIC LINEAR PROGRAMMING: Models, Theory, and Computation*

Sethi, Yan & Zhang/ *INVENTORY AND SUPPLY CHAIN MANAGEMENT WITH FORECAST UPDATES*

Cox/ *QUANTITATIVE HEALTH RISK ANALYSIS METHODS: Modeling the Human Health Impacts of Antibiotics Used in Food Animals*

Ching & Ng/ *MARKOV CHAINS: Models, Algorithms and Applications*

Li & Sun/ *NONLINEAR INTEGER PROGRAMMING*

Kaliszewski/ *SOFT COMPUTING FOR COMPLEX MULTIPLE CRITERIA DECISION MAKING*

**** A list of the more recent publications in the series is at the front of the book ****