

Contact Information

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Research Interests

Algorithm development and application of operations research methods, particularly mathematical optimization.

Employment History

Michigan State University

May 2012 – present	Professor Emeritus of Management Science (retired)
July 1997 – May 2012	Professor of Management Science
July 1985 – June 1997	Associate Professor of Management Science
September 1980 – June 1985	Assistant Professor of Management Science
September 1979 – August 1980	Visiting Assistant Professor of Management Science
July 1979 – August 1979	Visiting Instructor

Education

Ph. D. in Mathematics, Michigan State University, 1980.

Dissertation: “Existence and Computation of Static Equilibria in Certain Economic Models, with Application to the PIES Model of the Energy Sector” (under Prof. V. P. Sreedharan).

M. S. in Probability and Statistics, Michigan State University, 1978.

A. B. in Mathematics, Princeton University, 1973.

Refereed Journal Articles

Harrington, W., P. A. Rubin and L. Bai. An Optimization Approach to Panel Size Management. *Operations Research for Health Care*, Vol. 31, December 2021.

Rubin, P. A. and M. Gentili. An Exact Method for Locating Counting Sensors in Flow Observability Problems. *Transportation Research Part Part C: Emerging Technologies*, Vol. 123, February 2021.

- Çapar, İ., B. B. Keskin and P. A. Rubin. An improved formulation for the maximum coverage patrol routing problem. *Computers & Operations Research*, Vol. 59, July 2015.
- Rubin, P. A. and L. Bai. Forming competitively balanced teams. *IIE Transactions*, Vol. 47, No. 6, June 2015.
- Bai, L. and P. A. Rubin. Combinatorial Benders cuts for the minimum toll booth problem. *Operations Research*, Vol. 57, No. 6, November-December 2009.
- Asparouhov, O and P. A. Rubin. Oscillation heuristics for the two-group classification problem. *Journal of Classification*, Vol. 21, No. 2, December 2004.
- Rubin, P. A. Comment on "A nonlinear Lagrangian dual for integer programming". *Operations Research Letters*, Vol. 32, No. 2, March 2004.
- Murthy, N. N., W. C. Benton and P. A. Rubin. Offsetting inventory cycles of items sharing storage. *European Journal of Operational Research*, Vol. 150, No. 2, October 2003.
- Rubin, P. A. and W. C. Benton. Evaluating jointly constrained order quantity complexities for incremental discounts. *European Journal of Operational Research*, Vol. 149, No. 3, September 2003.
- Iannarilli, F. J. Jr. and P. A. Rubin. Feature selection for multi-class discrimination via mixed-integer linear programming. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Vol. 25, No. 6, June 2003.
- Rubin, P. A. and W. C. Benton. A generalized framework for quantity discount pricing schedules. *Decision Sciences*, Vol. 34, No. 1, Winter 2003.
- Tan, K. C., R. Narasimhan, P. A. Rubin and G. L. Ragatz. A comparison of four methods for minimizing total tardiness on a single processor with sequence dependent setup times. *Omega*, Vol. 28, No. 3, June 2000.
- Rubin, P. A. Adapting the Warmack-Gonzalez algorithm to handle discrete data. *European Journal of Operational Research*, Vol. 113, No. 3, March 1999.
- Rubin, P. A. Solving mixed integer classification problems by decomposition. *Annals of Operations Research*, Vol. 74, 1997.
- Rubin, P. A. and G. L. Ragatz. Scheduling in a sequence dependent setup environment with genetic search. *Computers & Operations Research*, Vol. 22, No. 1, 1995.
- Rubin, P. A. A comment regarding polynomial discriminant functions (short communication). *European Journal of Operational Research*, Vol. 72, No. 1, January 1994.
- Rubin, P. A. and W. C. Benton. Jointly constrained order quantities with all-units discounts. *Naval Research Logistics*, Vol. 40, No. 2, March 1993.
- Rubin, P. A. Separation failure in linear programming discriminant models. *Decision Sciences*, Vol. 22, No. 3, July/August 1991.
- Rubin, P. A. A comparison of linear programming and parametric approaches to the two group discriminant problem. *Decision Sciences*, Vol. 21, No. 2, Spring 1990.
- Rubin, P. A. and J. R. Carter. Joint optimality in buyer-supplier negotiations. *Journal of Purchasing and Materials Management*, Vol. 26, No. 2, Spring 1990.

Rubin, P. A. Heuristic solution procedures for a mixed-integer programming discriminant model. *Managerial and Decision Economics*, Vol. 11, No. 4, October 1990.

Rubin, P. A. Evaluating the maximize minimum distance formulation of the linear discriminant problem. *European Journal of Operational Research*, Vol. 41, No. 2, July 1989.

Wagner, J. A. III, P. A. Rubin and T. J. Callahan. Incentive payment and nonmanagerial productivity: an interrupted time series analysis of magnitude and trend. *Organizational Behavior and Human Decision Processes*, Vol. 42, August 1988.

Lothner, D. C., H. M. Hoganson and P. A. Rubin. Examining short-rotation hybrid poplar investments by using stochastic simulation. *Canadian Journal of Forest Research*, Vol. 16, No. 6, December 1986.

Rubin, P. A. Short-run characteristics of samples drawn by random walks. *Communications in Statistics*, Vol. B14, No. 2, June 1985.

Rubin, P. A. and R. Narasimhan. Fuzzy goal programming with nested priorities. *Fuzzy Sets and Systems*, Vol. 14, No. 2, November 1984.

Rubin, P. A. Generating random points in a polytope. *Communications in Statistics*, Vol. B13, No. 3, May 1984.

Rubin, P. A., D. M. Dilts and B. A. Barron. Economic order quantities with quantity discounts. *Decision Sciences*, Vol. 14, No. 2, April 1983.

Rubin, P. A. Implementation of a subgradient projection algorithm. *International Journal of Computer Mathematics*, Vol. 12, No. 3-4, 1983.

Rubin, P. A. A note on the geometry of reciprocal fuzzy relations. *Fuzzy Sets and Systems*, Vol. 7, No. 3, May 1982.

Refereed Book Chapters

Rubin, P. A. Linear programming models for classification. In *Encyclopedia of Optimization* (C. A. Floudas and P. M. Pardalos, eds.), Kluwer Academic, 2001.

Rubin, P. A. Mixed integer classification problems. In *Encyclopedia of Optimization* (C. A. Floudas and P. M. Pardalos, eds.), Kluwer Academic, 2001.

Moch, M., A. Buchko and P. A. Rubin. A simulation-based time-series policy-capturing methodology for studying recurring decision making in organizations. In *Advances in Information Processing in Organizations* (J. Newsome, R. Cardy and S. Puffer, eds.), Vol. 3, JAI Press, 1988.

Refereed Conference Proceedings

Khalfallah, Z., I. Fajjari, N. Aitsaadi, P. Rubin and G. Pujolle. A novel 3D underwater WSN deployment strategy for full-coverage and connectivity in rivers. *2016 IEEE International Conference on Communications (ICC)*, 2016.

Murthy, N. N., W. C. Benton and P. A. Rubin. Offsetting inventory cycles in a storage space constrained environment. *Proceedings of the 2000 Annual Meeting of the Decision Sciences Institute*, November 2000.

Tan, K. C., R. Narasimhan, P. A. Rubin and G. L. Ragatz. Minimizing tardiness with sequence dependent setup times: A comparative study of branch-and-bound, genetic search and simulated annealing. *Proceedings of the 1996 Annual Meeting of the Decision Sciences Institute*, November 1996.

Rubin, P. A. and W. C. Benton. Jointly constrained order quantities with incremental discounts. *Proceedings of the 1995 Annual Meeting of the Decision Sciences Institute*, November 1995.

Rubin, P. A. and W. C. Benton. A partial enumeration algorithm for static capacitated location problems. *Proceedings of the 1994 Annual Meeting of the Decision Sciences Institute*, November 1994.

Murthy, N. N., W. C. Benton and P. A. Rubin. Jointly constrained order quantities and the natural inventory cycle. *Proceedings of the 1994 Annual Meeting of the Decision Sciences Institute*, November 1994.

Benton, W. C. and P. A. Rubin. A heuristic for the single echelon dynamic capacitated facility location problem. *Proceedings of the 1993 Annual Meeting of the Decision Sciences Institute*, November 1993.

D'Itri, M. and P. A. Rubin. A heuristic solution procedure for scheduling cutting stock in a multi-period, multi-process facility with sequence dependent setups. *Proceedings of the 1993 Annual Meeting of the Decision Sciences Institute*, November 1993.

Rubin, P. A. and G. L. Ragatz. Scheduling in a sequence dependent setup environment with genetic search. *Proceedings of the 1992 Annual Meeting of the Decision Sciences Institute*, November 1992. (Finalist for best paper award.)

D'Itri, M. and P. A. Rubin. A formulation for scheduling cutting stock in a multi-period, multi-process facility with sequence dependent setups. *Proceedings of the 1992 Annual Meeting of the Decision Sciences Institute*, November 1992.

Rubin, P. A. Pathologies in linear programming models for the two group discriminant problem. *Proceedings of the 1990 Annual Meeting of the Decision Sciences Institute*, November 1990.

Rubin, P. A. Efficient heuristics for identification of outliers in discriminant analysis. *Proceedings of the 1989 Annual Meeting of the Decision Sciences Institute*, November 1989.

Rubin, P. A. Economic benefits of cooperation between purchaser and vendor. *Proceedings of the Nineteenth Annual Meeting of the Midwest Decision Sciences Institute*, May 1988.

Rubin, P. A. The maximize minimum distance formulation of the linear discriminant problem. *Proceedings of the 1987 Annual Meeting of the Decision Sciences Institute*, November 1987.

Rubin, P. A. Exponential smoothing of series with geometric trend: an experimental analysis. *Proceedings of the 1986 Annual Meeting of the Decision Sciences Institute*, November 1986.

Rubin, P. A. Forcing convexity in quadratic regression models. *Proceedings of the Seventeenth Annual Meeting of the Midwest Decision Sciences Institute*, April 1986.

Narasimhan, R., P. A. Rubin and S. A. Melnyk. Analyzing simulation output using time series intervention analysis. *Proceedings of the Seventeenth Annual Meeting of the American Institute for Decision Sciences*, November 1985.

Wagner, J. A. III, P. A. Rubin and T. J. Callahan. An intervention analysis of the productive efficacy of an equitable group incentive plan. *Proceedings of the Seventeenth Annual Meeting of the American Institute for Decision Sciences*, November 1985.

Rubin, P. A. A test of purchase decision rules for the case of stochastic prices. *Proceedings of the Sixteenth Annual Meeting of the American Institute for Decision Sciences*, November 1984.

Rubin, P. A. A comparison of three approaches to linear programming with multiple objectives. *Proceedings of the Midwest American Institute for Decision Sciences Conference*, April 1981.

Technical Reports

D'Itri, M. and P. Rubin. A heuristic procedure for sequence dependent scheduling with stock cutting. *Penn State-Behrend School of Business Working Paper Series*, 97-1, 1997.

Hoganson, H. M., D. C. Lothner and P. A. Rubin. Future market uncertainty: a case for short-rotation systems. In *Achieving Wood Energy Potential: Evidence in Northeastern Minnesota*, General Technical Report, North Central Forest Experiment Station.

Presentations

Rubin, P. A. and Gentili, M., Exact Method for Flow-Observability Problems. 16th INFORMS Computing Society Conference, Knoxville (TN), January 2019.

Rubin, P. A., Implicit Hitting Set Problems. University of Louisville INFORMS Student Chapter, Louisville (KY), April 2016.

Rubin, P. A., Twitter for O.R. - Microblogging to a Wide Audience. 2011 INFORMS Annual Meeting, Charlotte (NC), November 2011.

Bai, L. and Rubin, P. A., Combinatorial Benders cuts for the minimum toll booth problem. 2007 Annual Meeting of the Decision Sciences Institute, Phoenix, November 2007.

Bai, L. and Rubin, P. A., Combinatorial Benders cuts for the minimum toll booth problem. 2007 INFORMS Annual Meeting, Seattle, November 2007.

Benton, W. C. and Rubin, P. A., Supplier managed inventories (SMI) and supply chain power. 2007 INFORMS Annual Meeting, Seattle, November 2007.

Rubin, P. A. Writing publishable articles – editors speak up. Panel session, 2004 Annual Meeting of the Decision Sciences Institute, Boston, November 2004.

Rubin, P. A. Writing publishable articles – editors speak up. Panel session, 2003 Annual Meeting of the Decision Sciences Institute, Washington, D.C., November 2003.

Rubin, P. A. Web-delivered graded assignments in the MBA core statistics course. 2002 Annual Meeting of the Decision Sciences Institute, San Diego, November 2002.

Rubin, P. A. Writing publishable articles – editors speak up. Panel session, 2002 Annual Meeting of the Decision Sciences Institute, San Diego, November 2002.

Rubin, P. A. You be the jury – a virtual tenure review. Panel session/workshop, 2002 Annual Meeting of the Decision Sciences Institute, San Diego, November 2002.

Rubin, P. A. Reviewing journal submissions – tips and guidelines for doing a high quality review. Panel session, 2000 Annual Meeting of the Decision Sciences Institute, Orlando, November 2000.

Rubin, P. A. Nontraditional approaches to classification and discrimination. Panel session, 1995 Annual Meeting of the Decision Sciences Institute, Boston, November 1995.

Rubin, P. A. and G. L. Ragatz. Minimal Tardiness Scheduling of a Single Processor via Genetic Search. INFORMS National Meeting, New Orleans, 1995.

Rubin, P. A. Jointly constrained order quantities with independent discounts. Colloquium, College of Administrative Science, Ohio State University, October 1993.

Rubin, P. A. Mathematical programming and alternative classification models. Invited paper, Multicriterion Decision Making and Artificial Intelligence cluster, TIMS/ORSA Joint National Meeting, Orlando, April 1992.

Rubin, P. A. Heuristic solution procedures for a mixed integer programming discriminant model. Workshop on Mathematical Programming Models for Discriminant Analysis, University of Florida, April 1989.

Rubin, P. A. Bias correction of Holt forecasts for series containing geometric trend. Proceedings of the Annual Meeting of the Decision Sciences Institute, November 1988.

Rubin, P. A. and J. A. Wagner III. Time series analysis for changes in productivity: some problems. Proceedings of the Seventeenth Annual Meeting of the American Institute for Decision Sciences, November 1985.

Rubin, P. A. Linear programming under uncertainty. A colloquium sponsored by the Department of Statistics and Probability, Michigan State University, January 1983.

Rubin, P. A. Implementation of a subgradient projection algorithm. TIMS/ORSA Joint National Conference, Detroit, 1982.

Rubin, P. A. Elements of nonlinear optimization. A joint mathematics colloquium of General Motors Institute and the University of Michigan at Flint, February 1980.

Miscellaneous

Rubin, P.A. Big data in small bites. (Invited guest column, "Analytic and Data Science" feature.) *Decision Line*, Vol. 46, No. 2, March 2015.

D'Itri, Michael and P. Rubin. A heuristic procedure for sequence dependent scheduling with stock cutting. *Competition Forum*, Vol. 6, No. 1, 2008.

D'Itri, Michael and P. Rubin. Scheduling and sequencing with stock cutting considerations. *Competition Forum*, Vol. 5, No. 1, 2007.

Rubin, P. A., Optimizing with piecewise smooth functions. In *Computational Economics and Finance* (Ed.: H. Varian), Springer-Verlag, 1996.

Rubin, P. A. A referee's lament. (Invited guest column, "Research Issues" feature.) *Decision Line*, Vol. 23, No. 4, July 1992.

Honors

Richard J. Lewis Quality of Excellence Award, The Eli Broad Graduate School of Management, Michigan State University, 2000.

Scholarly Achievement Award, Personnel/Human Resources Division, Academy of Management, 1989 (joint with J. Wagner and T. Callahan).

Research Grants

Senior researcher, NSF grant 0085921: Investigation of a Model for Online Resource Creation and Sharing in Educational Settings.

Principal investigator under a contract from the U. S. Forest Service (Cooperative Agreement No. 23-82-07): Implementing Risk Analysis in Economic Evaluations of Short-Rotation Intensive Culture Forest Plantations.

Co-investigator under a contract with the City of Lansing (MI) for development of computer tools to aid in the selection of routes for trash collection.

Professional Service

IDinsight Board of Advisors (2022-present)

Pro Bono Analytics committee, INFORMS (2016-present; chair 2019-2023)

COIN-OR Strategic Leadership Board (2010-2012)

AMPL User Advisory Board (2010-2011)

Information Technology committee, INFORMS (2011-2015)

Information Technology committee, Decision Sciences Institute (2011-2012)

Chair, Ad Hoc Committee on Web Site, Decision Sciences Institute (2009-2011)

Associate Editor, *Decision Sciences*, 1998-2004.

Associate program chair, DSI National Meeting, November 2000.

Session organizer, DSI National Meeting, November 1995.

Session organizer, ORSA/TIMS National Meeting, October 1994.

Session organizer, TIMS/ORSA National Meeting, May 1993.

Track chair (Forecasting), Decision Sciences Institute 1991 Annual Meeting.

Referee for:

Annals of Operations Research, Applied Mathematical Modeling, Computers & Industrial Engineering, Computers & Operations Research, Decision Sciences, Decision Support Systems, European Journal of Operational Research, IEEE Transactions on Pattern Analysis and Machine Intelligence, IIE Transactions, IIE Transactions, INFORMS Journal on Computing, INFORMS Journal on Optimization, International Journal of Information Technology & Decision Making, International Journal of Production Economics, International Journal of Production Research, International Transactions on Operational Research, Journal of Approximation Theory, Journal of Business Logistics, Journal of Global Optimization, Journal of Operations Management, Managerial and Decision Economics, Mathematics of Operations Research, Michigan Academician, Naval Research Logistics, Omega, OPSEARCH, Optimization Letters, Production and Operations Management.

Reviewer of competitive grant proposals for the Michigan Department of Commerce (1985).

Reviewer of competitive grant proposals for the Natural Sciences and Engineering Research Council of Canada (1994).

Referee for regional and national DSI meetings.

Courses Taught at Michigan State University

Undergraduate

- MGT 304 Operations Planning and Control
Junior-senior course in production management, including quality management, process design, capacity planning, facility layout and location, demand forecasting, inventory and production planning.
- MGT 306 Analysis of Processes and Systems
Junior-senior level introduction to management science topics, including linear programming and related optimization techniques, project management, forecasting, queueing, etc.
- MGT 325 Management Skills and Processes
Junior-senior level introduction to organizational behavior, including motivation and job satisfaction, team formation and performance, organizational design and international dimensions of organizational behavior.

MBA

- MBA 804 Applied Data Analysis for Managers
Statistical analysis of data, primarily time series, to extract information useful in making managerial decisions.
- MBA 841 Studies in the Global Marketplace
International field trip course, elective for MBA candidates.
- MGT 805 Decision Models for Management
Elective course in optimization (emphasizing spreadsheets) and simulation (using a mixture of spreadsheets and discrete simulation software).
- MGT 808 Database Management Systems
Introduction to design and management of database systems, oriented to nontechnical MBA students.
- MGT 820 Managing the Internetworked Firm
- MGT 890 Doing Business on the Internet
Seminar course designed to expose MBA candidates to the technology and governance structures of the Internet, and to identify key legal, managerial, financial and marketing issues that a manager must confront in deciding how, and whether, to position his/her company on the Internet.
- MGT 821 Managing Internet Commerce
An expanded version of MGT 820 that incorporates introductory coverage of the design of Internet applications, with hands-on experience designing a simple web-based application.

- MGT 831 Computers and Systems Analysis in Business
Introduction to computer systems, emphasizing personal computers, for MBA candidates unfamiliar with computers.
- MGT 832 Introduction to Business Statistics
First course in statistics, including data analysis, hypothesis testing, regression and correlation, for MBA candidates without prior training in statistics.
- MGT 833 Decision Support Models
Regression analysis applied to longitudinal data, application of fundamental management science models (linear and integer programming, networks, project management, queueing) to business problems.
- PIM 850 Analysis and Decision Modeling
Statistical methods (primarily regression analysis) for the analysis of business data; taught as an e-learning (online) course in the weekend MBA program.

MBA/MS/PhD

(Courses offered for MS candidates in operations research, MBA candidates in management science, and PhD candidates in management science and operations management.)

- MGT 834 Linear Optimization Models
Theory and algorithms of linear programming, including common variants of the Simplex method, duality and sensitivity analysis, decomposition of large problems, solution of transportation problems.
- MGT 835 Nonlinear Optimization Models
Nonlinear programming theory and algorithms, including measurement of computational complexity, conditions for optimality, search methods in one dimension, conjugate gradient and quasi-Newton algorithms.
- MGT 835 Advanced Optimization Models
Network optimization models (shortest path, minimum spanning tree, maximum flow, minimum cost flow) and corresponding methods, fundamentals of integer programming (partial enumeration, cutting planes, branch-and-bound), and discrete dynamic programming methods.
- MGT 836 Applied Stochastic Processes
Survey of topics in the theory of stochastic processes, with application to business problems. Conditional probability, Markov chains and continuous-time Markov processes, branching processes, renewal theory, introduction to queueing theory.

- MGT 837 Systems Simulation
Digital simulation of stochastic systems, including the use of special purpose simulation languages, construction of experiments, selection of probability distributions, statistical analysis of output.
- MGT 890 Seminar in Advanced Optimization Methods
Introduction to stochastic linear programming and dynamic programming.
- MGT 914 Applied Regression Models in Business Research
Doctoral seminar covering the use of linear, nonlinear and logistic regression models in business research.
- MGT 921 Seminar in Inventory Theory
Doctoral seminar surveying major research themes in inventory theory.
- MSC 990 Analytical Research Methods in Operations Management
Doctoral seminar on optimization models and methods for doctoral candidates in operations management.