CURRICULUM VITAE

Stephen Michael Robinson

Office Address

Department of Industrial and Systems Engineering, University of Wisconsin-Madison, 1513 University Avenue Rm 3015, Madison, WI 53706-1539 *Phone:* 608-263-6862 *Email:* smrobins@wisc.edu

Professional Interests

Variational analysis, including mathematical optimization; quantitative methods in managerial economics; public policy in research and development

Education

B.A. (Mathematics)	1962	University of Wisconsin
M.S. (Mathematics)	1963	New York University
Ph.D. (Computer Sciences)	1971	University of Wisconsin-Madison
Diploma	1986	U.S. Army War College

Professional Honors

- George E. Kimball Medal, Institute for Operations Research and the Management Sciences (INFORMS), 2011
- Fellow of the Society for Industrial and Applied Mathematics (SIAM), 2009
- National Associate of the National Research Council, 2008
- Member of the National Academy of Engineering, 2008
- Fellow of INFORMS, 2004
- John K. Walker, Jr. Award, Military Operations Research Society, 2001
- George B. Dantzig Prize, Mathematical Programming Society and SIAM, 1997
- Doctor honoris causa, Universität Zürich, Switzerland, 1996

Biographical Listings

Who's Who in America (from 43d Edition to present)

Research and Writing

Author or co-author of 106 papers in professional journals, books, and proceedings, as well as additional preprints and technical reports; co-author, editor, or co-editor of seven books; speaker for numerous invited lectures at professional meetings since 1972

Military Awards and Decorations

Legion of Merit Bronze Star Medal Air Medal Army Commendation Medal (three awards) Armed Forces Honor Medal, First Class (Republic of Vietnam) Staff Service Honor Medal, First Class (Republic of Vietnam) Combat Infantryman Badge Parachutist Badge Special Forces Tab

Principal Employment

University of Wisconsin-Madison, 1969 - present

Faculty member 1972-2007. Currently Professor Emeritus of Industrial and Systems Engineering and of Computer Sciences.

Principal collateral s	ervice appointments at the University of Wisconsin-Madison:
1971-74	Assistant Director, Mathematics Research Center
1981-84	Chair, Department of Industrial Engineering
1983-84	Senior Staff Associate - Academic Planning, Office of the Vice
	Chancellor for Academic Affairs
1997-99	The University Committee (Chair, 1998-99)
2013	Interim Chair, Department of Mechanical Engineering (July –
	September)
2015-16	Interim Chair, Department of Materials Science and Engineering
	(1 August 2015 – 30 June 2016)

Army of the United States, 1962 - present

Commissioned 1962; served as Regular Army officer 1963-69; retired 1993 as Colonel, Special Forces Branch.

Academic Awards

- Phi Eta Sigma
- Phi Kappa Phi
- Sigma Xi
- Outstanding Instructor Award, College of Engineering, University of Wisconsin-Madison, 1980, 1981, 1994, 2000
- Byron Bird Award for Excellence in a Research Publication, College of Engineering, University of Wisconsin-Madison, 1996

Governmental Service (other than military)

- U. S. National Science Foundation:
 - Consultant to Office of Inspector General, 1996–97
 - Member of advisory panels to evaluate research proposals
- U. S. Department of the Army:
 - Member, Research Advisory Committee for Center on Advanced Distributed Simulation established under DOD-URI Infrastructure Program, 1995–96 (Chair, 1996)

- Member, Board of Visitors, Mathematics and Computer Sciences Division, U. S. Army Research Office, 1997
- Member of divisional strategic planning and advisory committees, U. S. Army Research Office, 1998, 2005, 2008, 2010
- Chair, Board of Visitors, Mathematical Sciences Division, U. S. Army Research Office, 2010
- Member, Board of Visitors, Mathematical Sciences Division, U. S. Army Research Office, 2012
- Member, Board of Visitors, Network Sciences Division, U. S. Army Research Office, 2012
- U. S. Department of the Navy:
 - Member, External Review Committee for the Operations Research Department, U.S. Naval Postgraduate School, 2017
- U. S. Department of Energy: Member of advisory panel to evaluate funded research programs, 1993
- U. S. Department of the Interior: Consultant to the U. S. Geological Survey on land-use information systems (WAE appointment), 1970–73
- Village of Shorewood Hills, Wisconsin:
 - Trustee (elected public office), 1974–76
 - Member and/or chairman of governmental committees (Finance, Personnel, etc.), 1973 – 87

Professional Service

- The National Academies of Sciences, Engineering, and Medicine (NASEM)
 - Chair, NASEM Board on Mathematical Sciences and Analytics (BMSA) (17 Jan 2017—30 Jun 2019)
 - Chair, NASEM Board on International Scientific Organizations (BISO) (8 Nov 2017—30 Jun 2019)
 - Chair, NASEM Committee on Strengthening Data Science Methods for Department of Defense Personnel and Readiness Missions (2015 – 2016)
 - Member, NASEM Report Review Committee (2012-)
 - Chair, National Research Council (NRC) Committee to Review the Board on Mathematical Sciences and Their Applications (2015)
 - Member, US National Member Organization for the International Institute for Applied Systems Analysis (2014–)
 - Chair, National Academy of Engineering (NAE) Section 8 (Aug 2012–Jun 2014)
 - Member, NRC Committee to Review the Board on Mathematical Sciences and Their Applications (2012–13)
 - Vice Chair, NAE Section 8 (Apr 2012 Aug 2012)
 - Member, NRC Committee on Science, Technology, Engineering and Mathematics Workforce Needs for the U. S. Department of Defense and the U. S. Defense Industrial Base (2011–12)
 - Liaison Chair, NAE Section 8 (2010–2012)
 - Member, NRC Laboratory Assessment Board Panel on Survivability and Lethality Analysis (2009–12)

- Member, NRC Committee to Review the Board on Mathematical Sciences and Their Applications (2009)
- Member, NRC Committee on Experimentation and Rapid Prototyping in Support of Counterterrorism (2008–09)
- Member, NRC Committee on Modeling and Simulation for Defense Transformation (2004–06)
- Member, NRC Board on Mathematical Sciences and Their Applications (2001– 07)
- International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria:
 - Periodic visits to IIASA since mid-1970s for research
 - Fee contractor (9/2016–12/2016)
 - Guest Research Scholar (9/2017 12/2017)
 - Senior Research Scholar (1/2018 12/2018)
- American Institute for Economic Research (AIER):
 - Voting Member (2015)
 - Member, Standing Committee (2017)
- Institute for Operations Research and the Management Sciences (INFORMS) (formerly Operations Research Society of America (ORSA) and The Institute of Management Sciences (TIMS)):
 - Past President of INFORMS (2015)
 - President of INFORMS (2014)
 - President-Elect of INFORMS (2013)
 - Treasurer of INFORMS (2007–10)
 - Member, Publications Committee (2004–05)
 - Secretary of INFORMS (2000–03)
 - Mathematics of Operations Research:
 - Advisory Editor (1987–)
 - Editor (1981–86)
 - Associate Editor (1976–80)
 - Member, Review Committees for *Mathematics of Operations Research* (1995, 1998 (Chair), 2001, 2003, 2006)
 - Member, Lanchester Prize Committee (1997–98 (Chair, 1998))
 - Member of ORSA Council (1991–94)
 - Combined Publications Committee (TIMS and ORSA) (1986–93) (Chair, 1991– 93)
 - ORSA Publications Committee (1986–93 (Chair, 1990–1993))
 - Search Committee for Editor of *Operations Research* (1986–87)
 - ORSA Nominating Committee (1986)
 - Ad Hoc Committee to form the TIMS Management Science Roundtable (1982)
 - Associate Editor of *Operations Research* (1974–86)
- Mathematical Optimization Society (formerly Mathematical Programming Society):
 - Chair, ad hoc committee on a new prize in continuous optimization, 2001

- Chair, Selection Committee for the George B. Dantzig Prize, 1999–2000
- Member-at-Large of Council, 1991–1994
- Chair, Publications Committee, 1991–1995
- Associate Editor of *Mathematical Programming*, 1986–1991
- Chair, Committee on Algorithms and the Law, 1990
- Member, Committee on Stochastic Programming, 1982–1985
- *Mathematische Operationsforschung und Statistik, Series Optimization:* Member, Board of Editors, 1977–83
- **Princeton University:** Member of Advisory Council, Department of Civil Engineering and Operations Research, 1987–1995; member of special review committee for that department, 1992
- Simon's Rock College: Member, Board of Overseers, 1991–2002
- Stanford University: Member, Visiting Committee, Department of Engineering Economic Systems, 1989
- Stochastic Programming E-Print Series: Advisory Editor, 1999
- The Heartland Institute: Member, Board of Policy Advisers, 1992–2008

Expert Consultation

- Consultant to various commercial publishers from late 1970s to the present, on questions of managerial economics and operations research
- Springer Series in Operations Research and Financial Engineering (Springer): Series Editor, 1996–present (formerly Springer Series in Operations Research)
- Springer Undergraduate Texts in Mathematics and Technology (Springer): Member of Editorial Board to 2017
- Operations Research Letters (Elsevier Science): Advisory Editor, 2002–present
- Journal of Convex Analysis (Heldermann Verlag): Member, Editorial Board, 1993–2002
- Annals of Operations Research (Baltzer Science Publishers): Member, Editorial Board, 1984–1999
- Set-Valued Analysis (Kluwer Academic Publishers): Member, Editorial Board, 1992–1999
- Set-Valued and Variational Analysis (Springer): Member, Editorial Board, 2009–2017
- Journal of Optimization Theory and Applications (Springer): Member, Editorial Board, 2010–2017

Research Grants and Contracts

- Air Force Research Laboratory Grant FA9550-15-1-0212, "Expanding the Reach of Nonlinear Optimization," 06/01/2015 – 05/31/2018, \$424,089 (with Michael C. Ferris)
- 2. Air Force Research Laboratory Grant FA9550-10-1-0101, "Expanding the Reach of Nonlinear Optimization," 04/01/10 03/31/13, \$424,200 (with Michael C. Ferris)

- 3. U.S. Navy Fleet and Industrial Supply Center San Diego Cooperative Agreement N00244-10-1-0044, "Joint Improvised Explosive Device Defeat Organization: Studies and Program Development," 04/21/10-02/28/11, \$67,000
- U.S. Navy Fleet and Industrial Supply Center San Diego Cooperative Agreement N00244-08-2-0010, "NPS Research Advisory Committee Service," 09/30/08-07/31/09, \$67,000
- Air Force Office of Scientific Research Grant FA9550-07-1-0389, "Planning Under Uncertainty: Methods and Applications," 04/01/07 – 11/30/09, \$306,361 (with Michael C. Ferris and Andrew J. Miller)
- 6. National Library of Medicine (NIH) Grant 1 R21 LM008949-01A1, "Modeling Participation in the NHII," 09/30/06-09/29/07, \$255,266 (co-investigator; with Patricia F. Brennan (PI), Michael C. Ferris, and Stephen J. Wright)
- Air Force Office of Scientific Research Grant FA9550-04-1-0192, "Planning Under Uncertainty: Methods and Applications," 03/15/04 - 03/14/07, \$275,210 (with Michael C. Ferris and Andrew J. Miller)
- 8. National Science Foundation Grant DMS-0305930, "Variational Conditions: Structure and Computation," 06/01/03 09/30/06, \$177,372
- 9. U. S. Army Research Office Grant DAAD19-01-1-0502, "Modeling and Simulation Environment for Critical Infrastructure Protection," 05/01/01 04/30/06, \$4,214,294
- Air Force Office of Scientific Research Grant F49620-01-1-0040, "Planning Under Uncertainty: Methods and Applications," 11/1/00 - 01/14/04, \$347,640 (with Michael C. Ferris)
- Air Force Office of Scientific Research Grant F49620-98-1-0417, "Planning Under Uncertainty: Methods and Applications," 4/1/98 - 10/31/00, \$253,345 (with Michael C. Ferris)
- 12. U. S. Army Research Office Grant DAAG55-97-1-0324, "Competitive Tradeoff Modeling: Methodology, Computation, and Testing," 8/1/97 7/31/02, \$315,006
- 13. Air Force Office of Scientific Research Grant F49620-97-1-0283, "Planning Under Uncertainty: Methods and Applications," 4/1/97 12/31/97 \$74,940
- U. S. Army Research Office Grant DAAH04-95-1-0149, "Competitive Tradeoff Modeling: Methodology, Computation, and Testing," 3/20/95 - 9/19/97, \$258,516
- North Atlantic Treaty Organization (NATO)} Cooperative Research Grant CRG.950360, "Variational Analysis Applied to Nonsmooth Analysis and Generalized Equations," (with M. Théra, H. Attouch, and B. Mordukhovich), 4/95 - 4/97, BEF 240,000
- 16. Air Force Office of Scientific Research Grant F49620-95-1-0222, "Computation and Theory in Nonlinear Optimization," 3/1/95 2/29/96, \$62,805
- 17. Air Force Office of Scientific Research Grant F49620-93-1-0068, "Computation and Theory in Nonlinear Optimization, 11/15/92 11/14/94, \$119,340
- 18. U. S. Army Research Office Grant DAAL03-92-G-0408, "Scenario Analysis: Applications and Extensions," 9/28/92 9/27/93, \$45,000

- National Science Foundation Grant CCR-9109345, "Computation and Theory for a Class of Nonsmooth Equations," 2/1/92 - 6/30/95, \$119,740 with REU supplement of \$3,875; total \$123,615
- 20. U. S. Army Space and Strategic Defense Command Contract DASG60-91-C-0144, "Competitive Tradeoff Modeling: Methodology, Computation, and Testing," 9/9/91 - 3/31/94, \$145,473
- 21. Air Force Office of Scientific Research Grant AFOSR-91-0089, "Computation and Theory in Large-Scale Optimization," 11/15/90 11/14/92, \$104,319
- 22. U. S. Army Research Office Contract DAAL03-89-K-0149, "Competitive Tradeoff Modeling: Methodology, Computation, and Testing," 9/1/89 9/30/92, \$207,862
- 23. Air Force Office of Scientific Research Grant AFOSR-89-0058, "Computation and Theory in Nonlinear Optimization," 11/15/88 11/14/90, \$92,089
- 24. National Science Foundation Grant CCR-8801489, "Computation and Theory in Decentralized Optimization," 6/15/88 11/30/91, \$194,267
- 25. Air Force Office of Scientific Research Grant AFOSR-88-0090, "Computation and Theory in Large-Scale Optimization," 1/15/88 11/14/88, \$40,300
- 26. National Science Foundation Grant DCR-8502202, "Computational Approximation of Optimization problems," 6/15/85 11/30/88, \$151,899
- National Science Foundation Grant MCS-8200632, "Computation and Theory in Nonlinear Programming," (with O. L. Mangasarian and R. R. Meyer), 6/1/82 -11/30/85, \$387,821
- National Science Foundation Grant MCS-7901066, "Computation and Theory in Nonlinear Programming," (with O. L. Mangasarian and R. R. Meyer), 6/1/79 -11/30/82, \$274,126
- 29. National Science Foundation Grant MCS79-11684, "Nonlinear Programming Symposium 4," (with O. L. Mangasarian and R. R. Meyer), 9/1/79 8/31/81, \$13,008
- 30. National Science Foundation Grant MCS-7907217, "Symposium on Analysis and Computation of Fixed Points," 5/1/79 4/30/80, \$7,805
- 31. National Science Foundation Grant MCS76-24152, "Nonlinear Programming Symposium 3," (with O. L. Mangasarian and R. R. Meyer), 1/1/77 8/31/78, \$7,300
- National Science Foundation Grant DCR74-20584, "Computational Algorithms in Nonlinear Programming," modified as MCS74-20584 A02, "Computational and Theoretical Aspects of Nonlinear Optimization and Equilibrium Problems," (with O. L. Mangasarian and R. R. Meyer), 2/1/75 - 11/30/79, \$194,300

Doctoral Dissertations Supervised

- Javier Maguregui, Ph.D. (Computer Sciences) 1976. Dissertation: *Regular Multivalued Functions and Algorithmic Applications*. Went to Venezuelan Institute for Scientific Research (IVIC) for postdoctoral research, then to Universidad Simón Bolívar, Caracas, Venezuela, as Assistant Professor of Mathematics and Computer Science
- 2. Norman H. Josephy, Ph.D. (Industrial Engineering) 1979. Dissertation: *Newton's Method for Generalized Equations and the PIES Energy Model*. Went to Harvard University as Assistant Professor of Business Administration

- 3. J. Alfonso Reinoza, Ph.D. (Computer Sciences) 1979. Dissertation: *A Degree for Generalized Equations*. Went to Universidad Simón Bolívar, Caracas, Venezuela, as Assistant Professor of Mathematics and Computer Science
- 4. Cu Duong Ha, Ph.D. (Industrial Engineering) 1980. Dissertation: *Decomposition Methods for Structured Convex Programming*. Went to Virginia Commonwealth University, Richmond, VA, as Assistant Professor of Mathematical Sciences
- Ennio S. Stacchetti, Ph.D. (Computer Sciences) 1983. Dissertation: Analysis of a Dynamic Decentralized Economic Model. Went to Institute for Mathematics and Its Applications, University of Minnesota, for postdoctoral research, then to Stanford University as Assistant Professor of Engineering-Economic Systems
- 6. Liqun Qi, Ph.D. (Computer Sciences) 1984. Dissertation: *Finitely Convergent Methods for Solving Stochastic Linear Programming and Stochastic Network Flow Problems.* Went for postdoctoral research to International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria, and University of Pittsburgh, then returned to Tsinghua University, Beijing, China as Associate Professor of Applied Mathematics
- Mario J. Miranda, Ph.D. (Industrial Engineering and Economics) 1985. Dissertation: *Analysis of Rational Expectations Models for Storable Commodities under Government Regulation*. After postdoctoral research, went to University of Connecticut as Assistant Professor of Business Administration
- 8. Deepankar Medhi, Ph.D. (Computer Sciences) 1987. Dissertation: *Decomposition of Structured Large-Scale Optimization Problems and Parallel Optimization*. Went to AT&T Bell Laboratories as Member of Technical Staff
- 9. Koohyun Park, Ph.D. (Industrial Engineering) 1989. Dissertation: *Continuation Methods for Nonlinear Programming*. Went to Electronics and Telecommunications Research Institute, Republic of Korea, as Senior Researcher, with concurrent teaching appointment at Seoul National University
- Daniel Ralph, Ph.D. (Computer Sciences) 1990. Dissertation: Rank-1 Support Functionals and the Rank-1 Generalized Jacobian, Piecewise Linear Homeomorphisms. Went to the International Institute for Applied Systems Analysis and subsequently to Cornell University for postdoctoral research
- Bock Jin Chun, Ph.D. (Industrial Engineering) 1992. Dissertation: Scenario Analysis Modeling and Decomposition Methods for Optimization Under Uncertainty. Resumed duties as Lieutenant Colonel, Republic of Korea Air Force
- 12. Hichem Sellami, Ph.D. (Industrial Engineering) 1994. Dissertation: A Nonsmooth Continuation Method. Went to Université du Sud, Tunisia, as member of faculty in business administration
- 13. Dong Keun Lee, Ph.D. (Industrial Engineering) 1996. Dissertation: *Military Force Planning Problems Under Uncertainty*. Resumed duties as Major, Republic of Korea Army
- 14. Gül Gürkan, Ph.D. (Industrial Engineering) 1996. Dissertation: Performance Optimization in Simulation: Sample-Path Optimization of Buffer Allocations in Tandem Lines. Went to Tilburg University (Katholieke Universiteit Brabant), The Netherlands, as Assistant Professor in the Center for Economic Research
- 15. A. Yonca Özge, Ph.D. (Industrial Engineering) 1997. Dissertation: Sample-Path Solution of Stochastic Variational Inequalities and Simulation Optimization

Problems. Went to General Electric Corporation as Member of Corporate Research Department

- 16. Mert C. Demir, Ph.D. (Industrial Engineering) 2000. Dissertation: *Asymptotics and Confidence Regions for Stochastic Variational Inequalities*. Resumed duties as member of faculty at Marmara University, Istanbul, Turkey.
- Julien Granger, Ph.D. (Industrial Engineering) 2006. Dissertation: *Performance Improvement of Queueing Networks with Synchronization Stations*. Went to Praxair, Inc. as Senior Development Associate Optimization, Supply Chain Analysis & Logistics.
- 18. Shu Lu, Ph.D. (Industrial Engineering) 2007. Dissertation: Sensitivity of Variational Inequalities over Perturbed Polyhedral Convex Sets: Analysis and Implementation. Went to The University of North Carolina at Chapel Hill as Assistant Professor of Statistics and Operations Research

Publication List

Stephen M. Robinson

Books

- 1. R. H. Day and S. M. Robinson, eds., *Mathematical Topics in Economic Theory and Computation*. Society for Industrial and Applied Mathematics, Philadelphia 1972
- T. C. Hu and S. M. Robinson, eds., *Mathematical Programming*. Academic Press, New York 1973
- 3. O. L. Mangasarian, R. R. Meyer, and S. M. Robinson, eds., *Nonlinear Programming 2*. Academic Press, New York 1975
- 4. O. L. Mangasarian, R. R. Meyer, and S. M. Robinson, eds., *Nonlinear Programming 3*. Academic Press, New York 1978
- 5. S. M. Robinson, ed., *Analysis and Computation of Fixed Points*. Academic Press, New York 1980
- 6. O. L. Mangasarian, R. R. Meyer, and S. M. Robinson, eds., *Nonlinear Programming 4*. Academic Press, New York 1981
- 7. J. Chandra and S. M. Robinson, *An Uneasy Alliance: The Mathematics Research Center at the University of Wisconsin, 1956–1987.* Society for Industrial and Applied Mathematics, Philadelphia 2005. (ISBN-10: 0-89871-535-0)

Publications in Refereed Journals

- S. M. Robinson and A. H. Stroud, The approximate solution of an integral equation using high-order Gaussian quadrature formulas. *Mathematics of Computation* 15 (1961) 286 -288
- S. M. Robinson, Computing wind profile parameters. J. Atmospheric Sciences 19 (1962) 189 - 190
- 3. R. P. Iczkowski, J. L. Margrave, and S. M. Robinson, Effusion of gases through conical orifices. *J. Physical Chemistry* **67** (1963) 229 233
- 4. S. M. Robinson, Interpolative solution of systems of nonlinear equations. *SIAM J. Numerical Analysis* **3** (1966) 650 658
- 5. R. I. Jennrich and S. M. Robinson, A Newton-Raphson algorithm for maximumlikelihood factor analysis. *Psychometrika* **34** (1969) 111 – 123
- 6. S. M. Robinson, Extension of Newton's method to nonlinear functions with values in a cone. *Numerische Mathematik* **19** (1972) 341 347
- 7. S. M. Robinson, A quadratically-convergent algorithm for general nonlinearprogramming problems, *Math. Programming* **3** (1972) 145 – 156
- 8. S. M. Robinson, Normed convex processes. *Trans. Amer. Math. Soc.* **174** (1972) 127 140
- 9. S. M. Robinson, Bounds for error in the solution set of a perturbed linear program. *Linear Algebra Appl.* **6** (1973) 69 – 81
- 10. S. M. Robinson and R. R. Meyer, Lower semicontinuity of multivalued linearization mappings. *SIAM J. Control* **11** (1973) 525 533
- S. M. Robinson, Irreducibility in the von Neumann model. *Econometrica* 41 (1973) 569 – 573

- 12. S. M. Robinson, Computable error bounds for nonlinear programming, *Math. Programming* **5** (1973) 235 242
- 13. S. M. Robinson, An inverse-function theorem for a class of multivalued functions. *Proc. Amer. Math. Soc.* **41** (1973) 211 218
- 14. S. M. Robinson and R. H. Day, A sufficient condition for continuity of optimal sets in mathematical programming. *J. Math. Anal. Appl.* **45** (1974) 506 511
- 15. S. M. Robinson, Perturbed Kuhn-Tucker points and rates of convergence for a class of nonlinear-programming algorithms. *Math. Programming* **7** (1974) 1 16
- 16. S. M. Robinson, An application of error bounds for convex programming in a linear space. *SIAM J. Control* **13** (1975) 271 273
- 17. S. M. Robinson, Stability theory for systems of inequalities, Part I: Linear systems. *SIAM J. Numerical Analysis* **12** (1975) 754 – 769
- 18. S. M. Robinson, First order conditions for general nonlinear optimization. *SIAM J. Applied Math.* **30** (1976) 597 607
- S. M. Robinson, Regularity and stability for convex multivalued functions. *Math. Operations Res.* 1 (1976) 130 143. Acknowledgment, *Math. Operations Res.* 2 (1977) 382
- 20. S. M. Robinson, Stability theory for systems of inequalities, Part II: Differentiable nonlinear systems. *SIAM J. Numerical Analysis* **13** (1976) 497 513
- 21. S. M. Robinson, A characterization of stability in linear programming. *Operations Res.* **25** (1977) 435 447
- 22. S. M. Robinson, Generalized equations and their solutions, Part I: Basic theory. *Math. Programming Studies* **10** (1979) 128 141
- 23. S. M. Robinson, Quadratic interpolation is risky. SIAM J. Numerical Analysis 16 (1979) 377 379
- 24. S. M. Robinson, Strongly regular generalized equations. *Math. Operations Res.* **5** (1980) 43 62
- 25. M. J. Best, J. Bräuninger, K. Ritter, and S. M. Robinson, A globally and quadratically convergent algorithm for general nonlinear programming problems. *Computing* 26 (1981) 141 – 153
- 26. S. M. Robinson, Some continuity properties of polyhedral multifunctions. *Math. Programming Studies* **14** (1981) 206 214
- 27. S. M. Robinson, Generalized equations and their solutions, Part II: Applications to nonlinear programming. *Math. Programming Studies* **19** (1982) 200 221
- 28. S. M. Robinson, Local structure of feasible sets in nonlinear programming, Part II: Nondegeneracy. *Math. Programming Studies* **22** (1984) 217 230
- S. M. Robinson, Local structure of feasible sets in nonlinear programming, Part III: Stability and sensitivity. *Math. Programming Studies* 30 (1987) 45 – 66. Corrigenda, *Math. Programming* 49 (1990) 143
- 30. S. M. Robinson, Local epi-continuity and local optimization. *Math. Programming* **37** (1987) 208 – 222
- 31. S. M. Robinson and R. J-B Wets, Stability in two-stage stochastic programming. *SIAM Journal on Control and Optimization* **25** (1987) 1409 – 1416
- 32. S. M. Robinson, Bundle-based decomposition: Conditions for convergence. *Analyse* Non Linéaire, Annales de l'Institut Henri Poincaré **6** (suppl) (1989) 435 – 447

- 33. S. M. Robinson, Mathematical foundations of nonsmooth embedding methods. *Mathematical Programming* **48** (1990) 221 – 229
- 34. S. M. Robinson, An implicit-function theorem for a class of nonsmooth functions. *Mathematics of Operations Research* **16** (1991) 292 309
- 35. S. M. Robinson, Extended scenario analysis. *Annals of Operations Research* **31** (1991) 385 397
- 36. S. M. Robinson, Normal maps induced by linear transformations. *Mathematics of Operations Research* **17** (1992) 691 714
- 37. S. M. Robinson, Shadow prices for measures of effectiveness, I: Linear model. Operations Research 41 (1993) 518 – 535; Erratum, Operations Research 48 (2000) 185
- 38. S. M. Robinson, Shadow prices for measures of effectiveness, II: General model. *Operations Research* **41** (1993) 536 – 548
- 39. S. M. Robinson, Nonsingularity and symmetry for linear normal maps. *Mathematical Programming* **62** (1993) 415 425
- 40. S. M. Robinson, Newton's method for a class of nonsmooth functions. *Set-Valued Analysis* **2** (1994) 291 305
- 41. B. J. Chun and S. M. Robinson, Scenario analysis via bundle decomposition. Annals of Operations Research **56** (1995) 39 – 63
- 42. S. M. Robinson, Convergence of subdifferentials under strong stochastic convexity. *Management Science* **41** (1995) 1397 – 1401
- 43. P. E. Ney and S. M. Robinson, Polyhedral approximation of convex sets with an application to large deviation probability theory. *Journal of Convex Analysis* **2** (1995) 229 240
- 44. S. M. Robinson, Analysis of sample-path optimization. *Mathematics of Operations Research* **21** (1996) 513 – 528
- 45. E. L. Plambeck, B.-R. Fu, S. M. Robinson, and R. Suri, Sample-path optimization of convex stochastic performance functions. *Mathematical Programming* 75 (1996) 137 – 176
- 46. H. Sellami and S. M. Robinson, Implementation of a continuation method for normal maps. *Mathematical Programming* **76** (1997) 563 578
- 47. S. M. Robinson, A reduction method for variational inequalities. *Mathematical Programming* **80** (1998) 161 – 169
- 48. G. Gürkan, A. Y. Özge, and S. M. Robinson, Sample-path solution of stochastic variational inequalities. *Mathematical Programming* **84** (1999) 313 333
- 49. S. M. Robinson, Composition duality and maximal monotonicity. *Mathematical Programming* **85** (1999) 1 – 13
- 50. S. M. Robinson, Linear convergence of epsilon-subgradient descent methods for a class of convex functions. *Mathematical Programming* **86** (1999) 41 50
- 51. S. M. Robinson, Constraint nondegeneracy in variational analysis. *Mathematics of Operations Research* **28** (2003) 201 232
- 52. S. M. Robinson, Variational conditions with smooth constraints: Structure and analysis. *Mathematical Programming* **97** (2003) 245 265
- 53. S. M. Robinson, Localized normal maps and the stability of variational conditions. Set-Valued Analysis 12 (2004) 259 – 274; Errata, Set-Valued Analysis 14 (2006) 207

- 54. S. M. Robinson, A linearization method for nondegenerate variational conditions. *Journal of Global Optimization* **28** (2004) 405–417
- 55. J. Granger, A. Krishnamurthy, and S. M. Robinson, Rapid improvement of stochastic networks using two-moment approximations. *Mathematical and Computer Modelling* **43** (2006) 1038–1060
- 56. N.K. Stout, M.A. Rosenberg, A. Trentham-Dietz, M.A. Smith, S.M. Robinson, and D.G. Fryback, Retrospective cost-effectiveness analysis of screening mammography. *Journal of the National Cancer Institute* **98** (2006) 774–782. Previously published abstract: Could we have done better? A retrospective costeffectiveness analysis of routine screening mammography. *Medical Decision Making* **25** (1) (2005) E2. Published online at http://mdm.sagepub.com/content/vol25/issue1/
- 57. S. M. Robinson, Strong regularity and the sensitivity analysis of traffic equilibria: A comment. *Transportation Science* **40** (2006) 540–542
- 58. S.M. Robinson, Solution continuity in monotone affine variational inequalities. *SIAM Journal on Optimization* **18** (2007) 1046–1060
- 59. Shu Lu and S.M. Robinson, Normal fans of polyhedral convex sets: Structures and connections. *Set-Valued Analysis* **16** (2008) 281–305
- 60. S.M. Robinson and Shu Lu, Solution continuity in variational conditions. *Journal of Global Optimization* **40** (2008) 405–415
- 61. Shu Lu and S.M. Robinson, Variational inequalities over perturbed polyhedral convex sets. *Mathematics of Operations Research* 33 (2008) 689-711
- 62. S. M. Robinson, A point-of-attraction result for Newton's method with point-based approximations. *Optimization* 60 (2011) 89–99; first published online 2010
- 63. S. M. Robinson, A short derivation of the conjugate of a supremum function. *Journal* of Convex Analysis **19** (2012) 569–574
- 64. S. M. Robinson, Equations on monotone graphs. *Mathematical Programming Series A*, published online 6 Jan 2012: DOI 10.1007/s10107-011-0509-4; published in print Vol. **141** (2013) 49–101
- 65. S. Sridhar, P. F. Brennan, S. J. Wright, and S. M. Robinson, Optimizing financial effects of HIE: A multi-party linear programming approach. *Journal of the American Medical Informatics Association*, published online June 25, 2012: DOI 10.1136/amiajnl-2011-000606
- 66. S. M. Robinson, The compression property for affine variational inequalities. *Numerical Functional Analysis and Optimization* **35** (2014) 1212–1224
- S. M. Robinson, Reduction of affine variational inequalities. *Computational Optimization and Applications*, published online 03 October 2015: DOI 10.1007/s10589-015-9796-7
- 68. S. M. Robinson, A short proof of the sticky face lemma. *Mathematical Programming Series B*, published online 13 June 2016: DOI 10.1007/s10107-016-1037-z

Scientific Publications in Other Than Refereed Journals

69. S. M. Robinson and G. W. Struble, A short method for measuring error in a least-squares power series. *Communications of the ACM* **3** (1960) 351

- 70. S. M. Robinson, Fitting spheres by the method of least squares. *Communications of the ACM* **4** (1961) 491
- S. M. Robinson, The tangent of a half-angle. *Amer. Math. Monthly* 72 (1965) 296 297
- 72. S. M. Robinson, A short proof of Cramer's rule. *Mathematics Magazine* 43 (1970) 94
 95. Reprinted in: S. Montgomery *et al.*, eds., *Selected Papers on Algebra*, pp. 313
 314. Mathematical Association of America, Washington, DC 1977
- 73. R. H. Day and S. M. Robinson, Economic decisions with L** utility. In: J. L. Cochrane and M. Zeleny, eds., *Multiple Criteria Decision Making*, pp. 84 92. University of South Carolina Press, Columbia, SC 1973
- 74. S. M. Robinson, A linearization technique for solving the irreducible von Neumann economic model. In: J. Łoś and M. W. Łoś, eds., *Mathematical Models in Economics*, pp. 139 - 150. Polish Scientific Publishers (PWN), Warszawa, and North-Holland, Amsterdam 1974
- S. M. Robinson, A subgradient algorithm for solving K-convex inequalities. In: W. Oettli and K. Ritter, eds., *Optimization and Operations Research*, pp. 237 - 245. Springer-Verlag, Berlin 1976
- 76. S. M. Robinson, Policy and price stability in the von Neumann model of a closed economy. In: J. Łoś and M. W. Łoś, eds., *Computing Equilibria: How and Why*, pp. 171 - 179. Polish Scientific Publishers (PWN), Warszawa, and North-Holland, Amsterdam 1976
- S. M. Robinson, Inverse sums of monotone operators. In: O. Moeschlin and D. Pallaschke, eds., *Game Theory and Mathematical Economics*, pp. 449 - 457. North-Holland, Amsterdam 1981
- S. M. Robinson, Generalized equations. Invited survey paper in: A. Bachem, M. Grötschel, and B. Korte, eds., *Mathematical Programming: The State of the Art, Bonn 1982*, pp. 346 367. Springer-Verlag, Berlin 1983
- S. M. Robinson, Local structure of feasible sets in nonlinear programming, Part I: Regularity. In: V. Pereyra and A. Reinoza, eds., *Numerical Methods*, pp. 240 - 251. Springer-Verlag (Lecture Notes in Mathematics No. 1005), Berlin 1983
- S. M. Robinson, Bundle-based decomposition: Description and preliminary results. In: A. Prékopa, J. Szelezsán, and B. Strazicky, eds., *System Modelling and Optimization*, pp. 751 - 756. Springer-Verlag (Lecture Notes in Control and Information Sciences No. 84), Berlin 1986
- S. M. Robinson, Convex programming. Invited essay in: J. Eatwell, M. Milgate, and P. Newman, eds., *The New Palgrave: A Dictionary of Economics*, v.1, pp. 647 - 659. Macmillan, London 1987
- S. M. Robinson, Homeomorphism conditions for normal maps of polyhedra. In: A. Ioffe, M. Marcus, and S. Reich, eds., *Optimization and Nonlinear Analysis*, pp. 240 248. Longman (Pitman Research Notes in Mathematics No. 244), Harlow, Essex, UK, 1992
- 83. E. L. Plambeck, B.-R. Fu, S. M. Robinson, and R. Suri, Throughput optimization in tandem production lines via nonsmooth programming. In: J. M. Schoen, ed., *Proceedings of the 1993 Summer Computer Simulation Conference*, pp. 70 - 75. Society for Computer Simulation, San Diego, CA 1993

- G. Gürkan, A. Y. Özge, and S. M. Robinson, Sample-path optimization in simulation. In: J. D. Tew, M. S. Manivannan, D. A. Sadowski, and A. F. Seila, eds., *Proceedings of the 1994 Winter Simulation Conference*, pp. 247 - 254.
- 85. S. M. Robinson, Sensitivity analysis of variational inequalities by normal-map techniques. In: F. Giannessi and A. Maugeri, eds., *Variational Inequalities and Network Equilibrium Problems*, pp. 257 269. Plenum Press, New York and London, 1995
- S. M. Robinson, Differential stability conditions for saddle problems on products of convex polyhedra. In: H. Fischer, B. Riedmüller, and S. Schäffler, eds., *Applied Mathematics and Parallel Computing - Festschrift for Klaus Ritter*, pp. 265 - 274, Physica-Verlag, Heidelberg, 1996
- H. Sellami and S. M. Robinson, Homotopies based on nonsmooth equations for solving nonlinear variational inequalities. In: G. Di Pillo and F. Giannessi, eds., *Nonlinear Optimization and Applications*, pp. 329 – 342. Plenum Publishing Corp., New York and London, 1996
- G. Gürkan, A. Y. Özge, and S. M. Robinson, Sample-path solution of stochastic variational inequalities, with applications to option pricing. In: J. M. Charnes, D. J. Morrice, D. T. Brunner, and J. M. Swain, eds., *Proceedings of the 1996 Winter Simulation Conference*, pp. 337 344.
- K. Ritter, S. M. Robinson, and S. Schäffler, Global minimization of Lennard-Jones functions on transputer networks. In: L. T. Biegler, T. F. Coleman, A. R. Conn, and F. N. Santosa, eds., *Large Scale Optimization with Applications, Part III: Molecular Structure and Optimization*, IMA Volumes in Mathematics and Its Applications No. 94, pp. 123 - 133. Springer-Verlag, New York, 1997.
- 90. S. M. Robinson, Nonsmooth continuation for generalized equations. In: P. Gritzmann, R. Horst, E. Sachs, and R. Tichatschke, eds., *Recent Advances in Optimization*, pp. 282 291. Springer-Verlag (Lecture Notes in Economics and Mathematical Systems No. 452), Heidelberg, 1997
- 91. G. Gürkan, A. Y. Özge, and S. M. Robinson, Sample-path solutions for simulation optimization problems and stochastic variational inequalities. In: D. L. Woodruff, ed., Advances in Computational and Stochastic Optimization, Logic Programming, and Heuristic Search: Interfaces in Computer Science and Operations Research, pp. 169 188. Kluwer Academic Publishers, Boston, 1998
- 92. R. R. Laferriere and S. M. Robinson, Scenario analysis in U. S. Army decision making. In: B. A. Bodt, ed., *Proceedings of the Fourth Annual U.S. Army Conference on Applied Statistics*, 21-23 October 1998, pp. 11-16. U. S. Army Research Laboratory Report ARL-SR-84, November 1999
- 93. G. Gürkan, A. Yonca Özge, and S. M. Robinson, Solving stochastic optimization problems with stochastic constraints: An application in network design. In: P.A. Farrington, H. B. Nembhard, D. T. Sturrock, and G. W. Evans, eds., *Proceedings of the 1999 Winter Simulation Conference*, pp. 471-478
- 94. R. R. Laferriere and S. M. Robinson, Scenario analysis in U. S. Army decision making, (Extensively revised version of No. 90) *Phalanx* **33**, No. 1 (2000) pp. 10 ff.
- 95. M. C. Fu, S. Andradóttir, J. S. Carson, F. Glover, C. R. Harrell, Y.-C. Ho, J. P. Kelly, and S. M. Robinson, *Integrating optimization and simulation: Research and*

practice. In: J. A. Joines, R. R. Barton, K. Kang, and P. A. Fishwick, eds., *Proceedings of the 2000 Winter Simulation Conference*, pp. 610-616

- 96. S. M. Robinson, Structural methods in the solution of variational inequalities. In: G. Di Pillo and F. Giannessi, eds., *Nonlinear Optimization and Related Topics*, pp. 369 380. Kluwer Academic Publishers, Dordrecht, 2000
- 97. S. M. Robinson, Generalized duality in variational analysis. In: N. Hadjisavvas and P. Pardalos, eds., *Advances in Convex Analysis and Global Optimization*, pp. 205 – 219. Kluwer Academic Publishers, Dordrecht, 2001
- 98. M. C. Ferris and S. M. Robinson, Enhanced technology for hard optimization problems. In: *Proceedings of the Third International Conference on Intelligent Processing and Manufacturing of Materials*, Eds. J. A. Meech, S. M. Veiga, M. M. Veiga, S. R. LeClair, and J. F. Maguire. IPMM-2001 (CD), Vancouver, BC, Canada, 2001
- 99. J. Granger, A. Krishnamurthy, and S. M. Robinson, Stochastic modeling of airlift operations. In: B. A. Peters, J. S. Smith, D. J. Medeiros, and M. W. Rohrer, eds., *Proceedings of the 2001 Winter Simulation Conference*, pp. 432 – 440
- 100.S. M. Robinson, False numerical convergence in some generalized Newton methods.
 In: P. Daniele, F. Giannessi and A. Maugeri, eds., *Equilibrium Problems and* Variational Models, pp. 401–416. Kluwer Academic Publishers, Dordrecht 2003
- 101.J. Granger, A. Krishnamurthy, and S. M. Robinson, Approximation and optimization for stochastic networks. In: K. Marti, Y. Ermoliev, and G. Pflug, eds., *Dynamic Stochastic Optimization*, pp. 67–79. Springer-Verlag (Lecture Notes in Economics and Mathematical Systems No. 532), Berlin 2004
- 102.S. M. Robinson, Aspects of the projector on prox-regular sets. In: F. Giannessi and A. Maugeri, eds., *Variational Analysis and Applications*, pp. 963 – 973. Kluwer Academic Publishers, Dordrecht 2004.
- 103.P. F. Brennan, M. Ferris, S. Robinson, S. Wright, and J. Marquard, Modeling participation in the NHII: Operations research approach. *AMIA Annual Symposium Proceedings 2005*, pp. 76-80
- 104.M. Bassiouni, V. M. Bier, P. Carayon, J. Chandra, R. K. Guha, S. B. Kraemer, S. M. Robinson, D. G. Schwartz, and S. Stoecklin, Analysis, modeling, and simulation for networked systems. In: C. Wang, et al., eds., *Department of Defense Sponsored Information Security Research: New Methods for Protecting Against Cyber Threats*, pp. 440–465. Wiley, Indianapolis, IN 2007 (ISBN-13: 978-0-471-78756-3)
- 105.M. Ferris, P. F. Brennan, L. Tang, J. Marquard, S. Robinson, and S. Wright, Creating operations research models to guide RHIO decision making. *AMIA Annual Symposium Proceedings* 2007, pp. 240-244
- 106.J. L. Marquard and S. M. Robinson, Reducing perceptual and cognitive challenges in making decisions with models. In: T. Kugler, J.C. Smith, T. Connolly, and Y.-J. Son, eds., *Decision Modeling and Behavior in Uncertain and Complex Environments*, pp. 33–55. Springer, New York, 2008 (ISBN-13: 978-0-387-77130-4)

Publications of the International Institute for Applied Systems Analysis (IIASA)

- 107.S.M. Robinson, Newton's method for systems of nonlinear equations, In: *Analysis and Computation of Equilibria and Regions of Stability*, ed. H. R. Grümm, IIASA Conference Proceedings CP-75-8, 1975.
- 108.S.M. Robinson, Local structure of feasible sets in nonlinear programming Part II. Nondegeneracy. IIASA Collaborative Paper CP-83-052, October 1983. Published in revised form as [28]
- 109.S.M. Robinson, Persistence and continuity of local minimizers. IIASA Collaborative Paper CP-84-005, February 1984. Also appeared in collection in honor of Prof. Dr. K. Nickel, privately printed 1984
- 110.S.M. Robinson, Bundle-based decomposition: Conditions for convergence. IIASA Working Paper WP-87-080, September 1987. Published in revised form as [32]
- 111.S.M. Robinson, An implicit-function theorem for B-differentiable functions. IIASA Working Paper WP-88-067, July 1988. Published in revised form as [34]
- 112.G. Gürkan, A. Y. Özge, and S. M. Robinson, Sample-path optimization in simulation. IIASA Working Paper WP-94-070, July 1994. Published in revised form as [82]
- 113.S.M. Robinson, Linear convergence of epsilon-subgradient descent methods for a class of convex functions. IIASA Working Paper WP-96-041, April 1996. Published in revised form as [50]

Technical Reports, Papers Submitted for Publication, Etc.

- 114.C. B. Tanner and S. M. Robinson, Black-body function σT^4 . Soils Bulletin 1, Department of Soils, University of Wisconsin, Madison 1959
- 115.S. M. Robinson, An embedding theorem for unbounded convex sets. *Technical Summary Report No. 1321*, Mathematics Research Center, University of Wisconsin-Madison 1973
- 116.S. M. Robinson, Perturbations in finite-dimensional systems of linear equations and inequalities, *Technical Summary Report No. 1357*, Mathematics Research Center, University of Wisconsin-Madison 1973
- 117.S. M. Robinson, An implicit-function theorem for generalized variational inequalities, *Technical Summary Report No. 1672*, Mathematics Research Center, University of Wisconsin-Madison 1976
- 118.S. M. Robinson, Implicit B-differentiability in generalized equations, *Technical Summary Report No. 2854*, Mathematics Research Center, University of Wisconsin-Madison 1985
- 119.S. M. Robinson, Minimax cost/benefit analysis. Preprint, 1992
- 120.S. M. Robinson, Estimating expected value of system testing. Section 5.5 (pp. 90-102) of: P. H. Deitz *et al., Evaluation Strategies for Live-Fire Planning, Analysis, and Testing,* Report No. ARL-TR-1273, U. S. Army Research Laboratory, Aberdeen Proving Ground, MD, December 1996

Book Reviews

- 1. S. M. Robinson, Review of *The Mathematical Work of Charles Babbage*, by J. M. Dubbey. *Isis* **70** (Issue 252) (1979) 326–327
- 2. S. M. Robinson, Review of *Convexity and Optimization in* **R**^{*n*}, by Leonard D. Berkovitz. *SIAM Review* **45** (2003) 159–160
- 3. S. M. Robinson, Review of *Constrained Optimization and Image Space Analysis*, v.1: Separation of Sets and Optimality Conditions, by Franco Giannessi. SIAM Review **48** (2006) 429–431
- 4. S. M. Robinson, Review of *Implicit Functions and Solution Mappings*, by A. Dontchev and R. T. Rockafellar. *Mathematical Reviews* MR 2515104 (2010g:49027).

Cases

1. Columbia Express, Inc. In: R. F. Love, J. G. Morris, and G. O. Wesolowsky, *Facilities Location: Models and Methods*, pp. 220-223. Elsevier Science, New York, 1988.

Committee Documents

- G. B. Dantzig, D. Goldfarb, E. Lawler, C. Monma, and S. M. Robinson (Chair), Report of the Committee on Algorithms and the Law, Mathematical Programming Society. *Optima* 33 (1991) 1 – 19
- 2. Committee on Modeling and Simulation for Defense Transformation, National Research Council, *Defense Modeling, Simulation, and Analysis: Meeting the Challenge,* 86 pp. The National Academies Press, Washington, DC, 2006 (ISBN-13: 978-0-309-10303-9)
- Committee on Experimentation and Rapid Prototyping in Support of Counterterrorism, National Research Council, *Experimentation and Rapid Prototyping in Support of Counterterrorism*, 91 pp. The National Academies Press, Washington, DC, 2009 (ISBN-13: 978-0-309-13668-6)
- 4. Army Research Laboratory Technical Assessment Board, National Research Council, 2009-2010 Assessment of the Army Research Laboratory, 123 pp. The National Academies Press, Washington, DC, 2009 (ISBN-13: 978-0-309-21140-6)
- 5. Committee on Science, Technology, Engineering, and Mathematics Workforce Needs for the U.S. Department of Defense and the U.S. Defense Industrial Base, Assuring the U.S. Department of Defense a Strong Science, Technology, Engineering, and Mathematics (STEM) Workforce, 139 pp. The National Academies Press, Washington, DC, 2009 (ISBN-13: 978-0-309-26213-2)
- 6. Committee on Strengthening Data Science Methods for Department of Defense Personnel and Readiness Missions, The National Academies of Sciences, Engineering, and Medicine, *Strengthening Data Science Methods for Department* of Defense Personnel and Readiness Missions, 149 pp. The National Academies Press, Washington, DC, 2017 (ISBN-13: 978-0-309-45078-2)

Nontechnical Writing

- 1. S. M. Robinson, invited comment on J. Scott Armstrong, The Ombudsman: Is review by peers as fair as it appears? *Interfaces* **12**, No. 5 (1982) 72 74
- S. M. Robinson, Patents on algorithms: A personal view. (Translated into Japanese by H. Konno) *Communications of Operations Research Society of Japan* 39 (1994) 332 – 335
- 3. S. M. Robinson, "The risky business of hiring stars," Letter to the Editor, *Harvard Business Review* 82 (9) (September, 2004) 131 132
- 4. S. M. Robinson, E. Rovenskaya, and U. Dieckmann, Systems analysis to inform and support global transformations, *SIAM News* January 2017