

ARTHUR F. VEINOTT, JR.

Address.

Dept. Management Science and Engineering
309 Terman Engineering Center
Stanford University
Stanford, CA 94305

Email: veinott@stanford.edu
URL: <http://www.stanford.edu/~veinott/>
Tel: (650) 725-0548

Areas of Specialization.

Operations Research and Management Science, Dynamic Programming, Lattice Programming, Supply-Chain Optimization, Network Flows, Optimization

Education.

1956 Lehigh University, B.S. in Industrial Engineering and B.A. in Arts and Science
1960 Columbia University, Eng. Sc.D. in Industrial Engineering (Operations Research specialization)

Honors.

John von Neumann Theory Prize, INFORMS, 2007
Fellow, INFORMS, 2002
Graduate Teaching Award 2000-01, Dept. Management Science & Engineering, Stanford University
National Academy of Engineering, 1986
Guggenheim Fellow, 1978-79
Fellow, The Institute of Mathematical Statistics, 1970
Higgins Fellow, Columbia University
Phi Beta Kappa, Lehigh University
Tau Beta Pi, Lehigh University
Omicron Delta Kappa, Lehigh University
4-year Competitive Regional Scholarship, Lehigh University

Professional Experience.

2009 (Jun)- Professor Emeritus of Operations Research, Dept. Man. Sci. & Engr., Stanford University
1967-09 Professor of Operations Research, Stanford University
2001-04 PI & Co-Director, GM-Stanford Collaborative Research Laboratory in Work Systems
1989-90 Academic Visitor, Computer Science Dept., IBM Research Center, Almaden, CA
1975-85 Chairman, Department of Operations Research, Stanford University
1972-73 Visiting Professor of Administrative Sciences, Yale University
1970 (Spr) Acting Chairman, Department of Operations Research, Stanford University
1968-69 Consultant to Mathematical Sciences Department, IBM Research Center, Yorktown Heights, NY
1964-67 Associate Professor of Industrial Engineering and Member, Committee-in-Charge, Program in Operations Research, Stanford University
1962-64 Assistant Professor of Industrial Engineering, Stanford University
1960-62 Operations Analyst, Operations Analysis Office, Air Force Logistics Command and 1st Lt., USAF
1959-60 Associate in Industrial Engineering, Columbia University
1957-59 Graduate Assistant, Industrial Engineering, Columbia University

Other Professional Activities.

Institute for Operations Research and the Management Sciences (INFORMS)
 John von Neumann Theory Prize Committee, 2000-02, Chair, 2001-02

Institute of Management Sciences
 Vice President-Publications, 1973-76
 Council Member, 1971-73

Operations Research Society of America
 Council Member, 1983-86
 Chair, Publications Committee, 1985-86
 Resources Planning Committee, 1975-77
 NSF Liaison Committee, 1984-86
 Committee to Select Editor-in-Chief of *Operations Research*, 1973

Joint ORSA/TIMS Committees
 Chair, Publications Committee, 1985-86
 John von Neumann Theory Prize Committee, 1983-86 & 2000-2002, Chair, 1986 & 2002
 Committee on Compensation of Journal Editors, 1982

Mathematics of Operations Research
 Founding Editor, 1974-80
 Advisory Editor, 1981-

Management Science
 Department Editor, Dynamic Programming and Inventory Theory, 1969-73
 Associate Editor, 1963-69

Annals of Statistics, Associate Editor, 1972-74
Mathematical Reviews, Reviewer, 1967-

Annual Comprehensive Index in Operations Research, Advisory Board, 1987-

NSF Panels
 Research Initiation Grants, 1971 and 1984
 Young Presidential Investigators, 1983
 Committee on New Directions in Operations Research, 1987

NRC Committee to Review Logistics Modernization Program of Defense Logistics Agency, 1987-89
 NRC Panel to Select Research Associates at Government Laboratories, 1991
 NAE Peer Committee on Industrial, Manufacturing and Operational Systems Engineering 1987-90.
 Chair, 1989-90.

Distinguished Visitor, Lectures on Markov Decision Processes: Sensitive Discount and Average
 Optimality, University of North Carolina at Raleigh, March 1968
 Lectures on Lattice Programming, IRIA, Versailles, France, 1974
 Principal Lecturer, 1989 Mathematical Sciences Lecture Series in Lattice Programming, The John's
 Hopkins University

Fulkerson Lectures on Lattice Programming and Markov Population Decision Chains, School of
 Industrial Engineering and Operations Research, Cornell University, 1990
 External Examiner, Dept. Industrial and Systems Engineering, National University of Singapore,
 1992-1996

Board of Governors, Institute for Mathematics and its Applications, University of Minnesota, 1994-96
 Sometime Consultant to RAND, Signetics, Arcata National, Woodward-Clyde
 Co-director, American Mathematical Society Summer Seminar in the Mathematics of the Decision
 Sciences, 1967

Professional Societies.

Institute for Operations Research and the Management Sciences

Date and Place of Birth.

October 12, 1934. Boston, Massachusetts

Publications.

1. *Ordering and Disposal of Inventory with FIFO or LIFO Issuing and Known Demands*. Technical Report No. 5, Statistical Engineering Group, Columbia University (December 5, 1959), 98 pp.
2. *Optimal Capacity Scheduling* (with H. Wagner). RM-3021, The RAND Corporation (February 1962), 74 pp.
3. Optimal Capacity Scheduling: I and II (with H. Wagner). *Operations Res.* 10, 4 (July-August 1962), 518-546.
4. Optimal Stockage Policies with Non-Stationary Stochastic Demands. In H. Scarf, D. Gilford, and M. Shelly (eds.). *Multistage Inventory Models and Techniques*. Stanford University Press (1963), 85-115.
5. Review of: G. Hadley and T. Whitin. *Analysis of Inventory Systems* (1963). In *J. Amer. Statist. Assoc.* 59, 305 (March 1964), 283-285.
6. Production Planning with Convex Costs: A Parametric Study. *Management Sci.* 10, 3 (April 1964), 441-460.
7. Review of: Jacques Lesourne, *Economic Analysis and Industrial Management* (1963). In *J. Amer. Statist. Assoc.* 59 (September 1964), 976-977.
8. Computing Optimal (s,S) Inventory Policies (with H. Wagner). *Management Sci.* 11, 5 (March 1965), 525-552. Selected by the editorial board of that journal in 2004 as one of the 50 most significant research contributions published in that journal during the past 50 years among those that are not survey papers and are cited at least 50 times according to the *Web of Science*.
9. *Mathematical Studies in Management Science* (ed.). Macmillan, New York, (1965).
10. The Optimal Inventory Policy for Batch Ordering. *Operations Res.* 13, 3 (May-June 1965), 424-432.
11. Optimal Policy in a Dynamic, Single Product, Nonstationary Inventory Model with Several Demand Classes. *Operations Res.* 13, 5 (September-October 1965), 761-778.
12. Optimal Policy for a Multi-Product, Dynamic, Nonstationary Inventory Problem. *Management Sci.* 12, 3 (November 1965), 206-222. Selected by the editorial board of that journal in 2004 as one of the 50 most significant research contributions published in that journal during the past 50 years among those that are not survey papers and are cited at least 50 times according to the *Web of Science*.
13. The Status of Mathematical Inventory Theory. *Management Sci.* 12, 9 (July 1966), 745-777. Also in *Logistics Research Conference*, 11-4, Department of Defense (1965), 109-170.
14. *A Property of Sequential Control Processes* (with R. Strauch). RM-4772-PR, The RAND Corporation, Santa Monica (January 1966), 8 pp.
15. On the Optimality of (s,S) Inventory Policies: New Conditions and a New Proof. *SIAM J. Appl. Math.* 14, 5 (September 1966), 1067-1083. (Also reprinted in [25] below.)

16. On Finding Optimal Policies in Discrete Dynamic Programming with No Discounting. *Ann. Math. Statist.* 37, 5 (October 1966), 1284-1294.
17. Optimal Policy for a Dynamic Multi-Echelon Inventory Model (with S. Bessler). *Naval Res. Logist. Quart.* 13, 4 (December 1966), 355-389.
18. Optimal Plant Size with Arbitrary Increasing Time Paths of Demand (with A. Manne). Chapter 11 in A. Manne (ed.), *Investments for Capacity Expansion: Size, Location, and Time-Phasing*, MIT Press, Cambridge, Mass. (1967), 178-192.
19. The Supporting Hyperplane Method for Unimodal Programming. *Operations Res.* 15, 1 (January-February 1967), 147-152.
20. A Solution to a Countable System of Equations Arising in Markovian Decision Processes (with C. Derman). *Ann. Math. Statist.* 38, 2 (April 1967), 582-584.
21. On the Convergence of Some Feasible Direction Algorithms for Nonlinear Programming (with D. Topkis). *SIAM J. Control* 5, 2 (May 1967), 268- 279.
22. Integral Extreme Points (with G. Dantzig). *SIAM Review* 10, 3 (July 1968), 371-372.
23. Extreme Points of Leontief Substitution Systems. *Linear Algebra Appl.* 1 (April 1968), 181-194.
24. Review of: J. Abadie (ed.), *Nonlinear Programming* (1967), in *J. Amer. Statist. Assoc.* 63, 323 (September 1968), 1063.
25. *Mathematics of the Decision Sciences*, Parts I and II (coed. with G. B. Dantzig). American Mathematical Society, Providence, R.I. (1968).
26. Optimality of Myopic Inventory Policies for Several Substitute Products (with E. Ignall). *Management Sci.* 15, 5 (January 1969), 284-304. (An expository version titled: Optimal Multi-Product Inventory Policy: Substitute Products, appears in J. Ferrier, *Large Scale Provisioning Systems*, English Universities Press (1968), 225-240.)
27. Minimum Concave Cost Solution of Leontief Substitution Models of Multi-facility Inventory Systems. *Operations Res.* 17, 2 (March-April 1969), 262-291.
28. Discrete Dynamic Programming with a Small Interest Rate (with B. Miller). *Ann. Math. Statist.* 40, 2 (April 1969), 366-370.
29. Discrete Dynamic Programming with Sensitive Discount Optimality Criteria. *Ann. Math. Statist.* 40, 5 (October 1969), 1635-1660.
30. Review of: A. Fiacco and G. McCormick, *Nonlinear Programming: Sequential Unconstrained Minimization Techniques* (1968), in *Math. Reviews* 39, 4 (1970), 929-930.
31. Review of: H. Wagner, *Principles of Management Science with Applications to Executive Decisions*, 1970, in *J. Business* (Chicago) 44, 2 (April 1971), 229.
32. Least d -Majorized Network Flows with Inventory and Statistical Applications. *Management Sci.* 17, 9 (May 1971), 547-567.

33. Polyhedral Sets Having a Least Element (with R. Cottle). *Math. Programming* 3, 2 (October 1972), 238-249.
34. Constrained Markov Decision Chains (with C. Derman). *Management Sci.* 19, 4 (November 1972), 389-390.
35. Computing a Graph's Period Quadratically by Node Condensation (with Y. Balcer). *Discrete Math.* 4 (1973), 295-303.
36. Review of: J. Marschak and R. Radner, *Economic Theory of Teams*, 1972, in *J. Econ. Lit.* 11, 2 (1973), 532-534.
37. Markov Decision Chains. In G. B. Dantzig and B. C. Eaves, *Studies in Optimization*, MAA Studies in Mathematics 10 (1974), 124-159.
38. Discovering Hidden Totally Leontief Substitution Systems (with G. B. Dantzig). *Math. Operations Res.* 3, 2 (May 1978), 102-103.
39. Dynamic Programming: Some Open Problems. In M. Puterman (ed.), *Dynamic Programming and Its Applications*. Academic Press (1978), 397-407.
40. *Infinite Linear Duals of Mixed-Integer Programs* (with F. Granot). Technical Report No. 28, Department of Operations Research, Stanford University, June 22, 1981, 17 pp. Revised September 26, 1984, 22 pp. Revised September 1985.
41. Substitutes, Complements and Ripples in Network Flows (with F. Granot). *Math. Operations Res.* 10, 3 (August 1985), 471-497.
42. Existence and Characterization of Minima of Concave Functions on Unbounded Convex Sets. *Math. Programming Study* 25 (1985), 88-92.
43. Inventory Policy Under Certainty. In J. Eatwell, M. Milgate, III, and P. K. Newman (eds.), *The New Palgrave: A Dictionary of Economics* 2, E-J, The Stockton Press, New York, New York (1987), 975-980.
44. The Multi-Armed Bandit Problem: Decomposition and Computation (with M. Katehakis). *Math. Operations Res.* 12, 2 (May 1987), 262-68.
45. Send-and-Split Method for Minimum-Concave-Cost Network Flows (with R. E. Erickson and C. L. Monma). *Math. Operations Res.* 12, 4 (November 1987), 634-666.
46. Representation of General and Polyhedral Subsemilattices and Sublattices of Product Spaces. *Linear Algebra Appl.* 114/115 (1989), 681-704.
47. Conjugate Duality for Convex Programs: A Geometric Development. *Linear Algebra Appl.* 114/115 (1989), 663-667.
48. *Substitutes, Complements and Ripples in Multicommodity Flows on Suspension Graphs* (with I. Ciurria and F. Granot). Unpublished Manuscript (1990), 29 pp.

49. *Substitutes, Complements and Ripples in Multicommodity Production Planning* (with I. Cieurria and F. Granot). Unpublished Manuscript (1990), 60 pp.
50. *Markov Branching Decision Chains: Immigration-Induced Optimality* (with U. G. Rothblum). Technical Report, Department of Operations Research, Stanford University, Stanford, CA (March, 1992), 100 pp. A revised version, titled *Markov Population Decision Chains*, is under contract with Springer-Verlag as a monograph, February 1994.
51. *Subextremal Functions and Lattice Programming* (with M. Li Calzi). Unpublished Manuscript (July 8, 1992), 21 pp.
52. Staircase Transportation Problems with Superadditive Rewards and Cumulative Capacities (with A. J. Hoffman). *Mathematical Programming* 62 (1993), 199-213.
53. Markov Branching Decision Chains with Interest-Rate-Dependent Rewards (with Y. Huang). *Prob. Engr. Infor. Sci.* 9 (1995), 99-121.
54. Gerald J. Lieberman (with A. Bowker and I. Olkin). *Prob. Engr. Infor. Sci.* 9 (1995), 3-26.
55. *Polynomial-Time Computation of n -Optimal Policies in Markov Decision Chains* (with Michael O'Sullivan). Unpublished Manuscript (August 12, 2007), 22 pp.
56. *Maximum-Stopping-Value Policies in Finite Markov Population Decision Chains* (with B. Curtis Eaves). Unpublished Manuscript (October 9, 2007), 14 pp.