



January 25, 2012

PROFESSOR HENRY WOLKOWICZ - (informal) CURRICULUM VITAE

(For more detailed information on research papers, talks, and teaching details, see my WWW home page.)

Personal Data

Citizenship: Canadian (as of 1956)

Born: Lodz, Poland, Feb. 25, 1948 (arrived in Canada December, 1949)

Married: Sept. 19, 1970.

Children: Son Daniel Howard, born Sept. 19, 1990.

Academic Information

Degrees:

1972 B.Sc. (Mathematics)	McGill University, Montreal
1975 M.Sc. (Applied Mathematics)	McGill University, Montreal
1978 Ph.D. (Mathematics)	McGill University, Montreal

Academic Positions:

1977	Lecturer, Department of Mathematics, McGill University
1978-1979	Assistant Professor, Department of Mathematics, Dalhousie University
1979-1985	Assistant Professor (promoted to assoc. in 1981), Department of Mathematics, University of Alberta
1985-1986	Associate Professor, Department of Mathematical Sciences, University of Delaware
1986-	Professor, tenured (promoted to full in 1989), Dept. of Combinatorics & Optimization, Univ. of Waterloo

Research Activities

Areas of Interest: Optimization; Mathematical Programming (linear, nonlinear, semidefinite programming, semi-infinite); Scheduling Problems; Quadratic Assignment Problem; Numerical Analysis (numerical linear algebra); Convex Analysis; Matrix Theory (eigenvalue bounds, invariant cones); Generalized Inverses (operators and matrices).

Visiting Appointments:

1982	Visiting Associate professor,, Teaching and Research (invited) Institute for Physical Science and Technology, The University of Maryland
1984-1985	Visiting Associate Professor (invited) Department of Mathematics and Computer Science, Emory University
1992/93	Visiting professor and Research Fellow (invited)

1999	Department of Civil Engineering and Operations Research, Princeton University Summer Research Visitor (invited)
2001	Laboratoire Approximation & Optimisation, Universite Paul Sabatier (Toulouse III) Summer Lecturer (invited)
2002	CEFET-RJ, UFRJ, UFF, IMPA, Rio de Janeiro, Brazil Summer Lecturer (invited)
2007	Scuola Matematica Interuniversitaria, Cortona/Firenze, Italy Summer Lecturer (invited) MSRI, Berkeley/CA, USA

Teaching Activities:

Courses (and Short Courses) Given:

1. Graduate:

(a) **Invited Optimization Courses/Workshops Given:**

MSRI, Berkeley, CA, July 9-20, 2007
 Short Course on Semidefinite Programming, Eighth SIAM Conference on Optimization, Stockholm, May 15-18, 2005
 Short course presentation Waterloo, ON, May, 2004
 Scuola Matematica Interuniversitaria, Firenze, Italy, Aug. 18-31, 2002
 Fields Institute, Jan.-Apr. 2002
 Joint Short Course, UFRJ, CEFET, IMPA in Rio de Janeiro, Brazil, on SDP and QAP, Apr. 10-24, 2001

(b) **Selection of University Courses Given:**

University of Alberta - Convex Analysis and Optimization
 The University of Maryland - Nonlinear Programming
 Emory University - Numerical Analysis
 University of Delaware - Nonlinear Programming; Advanced Linear Programming; Introduction to Statistics
 University of Waterloo - Continuous Optimization; Infinite Linear Programming; Semidefinite Programming

2. Undergraduate:

McGill University - Applied Matrix Algebra
 Dalhousie University - Calculus; Numerical Methods and Structured programming; Nonlinear Programming
 University of Alberta - Numerical Analysis ; Calculus; Mathematical Programming
 University of Delaware - Introduction to Statistics; Finite Mathematics
 University of Waterloo - Nonlinear Programming; Methods of Operations Research (coordinator); Linear Programming; Linear Algebra

NSERC Scholarship Summer Students

Mike Lamoreaux, The University of Alberta, 1983.
 Luo Quan Zheng, University of Waterloo, 1988.
 Cathy Bakos, University of Waterloo, 1990.
 Bernard Hsiung, University of Waterloo, 1990.
 Miguel Anjos, University of Waterloo, 1991.
 Dorian Birsan, University of Waterloo, 1991
 Jason Hinek, University of Waterloo, 1999
 Leo Tzou, University of Waterloo, 2000

Charles Fortin, University of Waterloo, 2001
Oleg Grodzevich, University of Waterloo, 2002
David Tweedle, University of Waterloo, 2004
David Tweedle, University of Waterloo, 2005
Jamie Sikora, University of Waterloo, 2005
Jiawei Qian, University of Waterloo, 2006

Supervised Students in Consulting Jobs

Steve Thomas, 1991; Mike Bandurchin, 1997-8; Samuel Lisi, 1998; Hua Wei, 2002-6; Mike Froh, 2002-3;
Oleg Grodzevich, 2003-2006.

Graduate Students:

M.Math.:

- Ravindar Kumar, “Bounds for Eigenvalues”, University of Alberta, 1984, [1].
- Christopher Schoettle, “The teaching assignment problem”, Emory University, 1985, [2].
- Peter Stephan, “An explicit solution to the quadratic dynamic programming problem”, Emory University, 1985, [3].
- Donna Tudhope, University of Waterloo (by essay) 1987.
- Joe Lund, “Optimal vehicle replacement policy”, 1988, [4].
- Qing Zhao, “Measures for Least Change Secant Methods”, University of Waterloo, 1992 [5].
- Steven Thomas, “Optimal Project Planning for a Pharmaceutical Company”, University of Waterloo.
- Stefan Karisch, “Trust Regions and the Quadratic Assignment Problem”, “University of Waterloo”, 1992, [6].
- Serge Kruk, “Semidefinite Programming Applied to General Nonlinear Programming”, “University of Waterloo”, 1996, [7].
- Charles Fortin, “A Survey of the Trust Region Subproblem within a Semidefinite Framework” “University of Waterloo”, 2000, [8].
- Mike Froh, Thesis, “University of Waterloo”, 2003, [9]
- Kathrin Schaeke, Essay, “University of Waterloo”, Mar. 2004, [10]
- Oleg Grodzevich, Thesis, “University of Waterloo”, Dec. 2004, [11]
- Yichuan Ding, “University of Waterloo”, Dec. 2005, [12]
- Xuezhi (Daniel) Cui, “University of Waterloo”, Sept. 2010, [13]
- Heng (Jerry) Ye, “University of Waterloo”, in progress.

Ph.D.:

- Scott Hadley, “Continuous Optimization Approaches for the Quadratic Assignment Problem”, University of Waterloo, 1990, [14].
- Qing Zhao, “Semidefinite Programming and Applications”, University of Waterloo, 1996, [15].
- Serge Kruk, “High Accuracy Algorithms for the Solutions of Semidefinite Linear Programs”, “University of Waterloo”, (Dec/01), [16].
- Miguel Anjos, “New Convex Relaxations for the Maximum Cut and VLSI Layout Problems”, University of Waterloo, [17], 2001.

- Francesc Rossell, visiting graduate student from Dept. of Statistics & Operations Research. Pau Gargallo, 5, 08026, Barcelona, Catalonia, 2002.
- Renata Sotirov, visiting graduate student from Institut fuer Mathematik, Universitaet Klagenfurt, Austria, 2003.
- Pawoumodom L. Takouda, visiting graduate student from Laboratoire Approximation & Optimisation, Universite Paul Sabatier (Toulouse III), France, 2004.
- Hua Wei, Thesis, “Robust Solutions for Large Sparse Linear and Semidefinite Programming”, [18].
- Nathan Krislock, “University of Waterloo”, Apr. 2010, [19]
- Yuen-Lam (Vris) Cheung, Thesis, in progress.
- Minghua Lin, Thesis, in progress.

Post. Doctorate Supervision:

- V. Jeyakumar, 1986
- Julie Falkner 1994
- Abdo Alfakih 1997-98
- Abdo Alfakih 1/2001-4/2001
- Veronica Piccialli, March-April, 2004.
- Pawoumodom L. Takouda, Sept. 2004 - July 2005.
- Veronica Piccialli, Sept. 2005 - March 2006.
- Simon Schurr, Nov. 2006 - Nov 2008.
- Pang Chin How (Jeffrey) Pang, Sept. 2009 - Sept. 2010.
- Vinh Xuan Doan, Nov. 2009 - Aug. 2011.
- Jason, Hinek, Sept. 2010 - Dec. 2010.
- Pong, Ting Kei, May. 2011 - inprogress
- Gillis, Nicolas, Sept. 2011 - inprogress

Service

Library Committee – University of Alberta – 1980-1985.

Undergraduate Affairs Committee – University of Waterloo – 1987-1989.

Tenure and Promotions Committee – University of Waterloo – 1996-1997.

Student Appeals Committee – University of Waterloo – 1996-1997.

Associate Chairman, Graduate Student Affairs – University of Waterloo – 1989-1991.

Associate Chairman, Graduate Student Affairs – University of Waterloo – 1997-1998.

University Student Appeals Committee – University of Waterloo – 2005-6.

Dept. representative to the University committee for the Fields Instit. — 2006-7. (various other committees including examiner of theses and promotion)

Professional Activities

Societies:

Society for Industrial and Applied Mathematics,

Mathematical Programming Society,

International Linear Algebra Society,

INFORMS

Consulting and Technological Transfers:

Edmonton Transit, 1983.
Teleride-Sage, Toronto, 1988-1989.
CIBA-GEIGY, Toronto, 1991-1992.
Private Company - Sam Bottner 1997-98.
Canada Correctional Services 1998.
Kitchener Transit 1999.
Bell University Labs, 2002-6.
Waterfront International Ltd (Financial), 2007-present.

Other:

Elected to SIAM Council, 2006; re-elected 2008.
Elected Chair for the SIAM Activity Group on Optimization (SIAG/OPT) for a three-year term beginning retroactively on January 1, 2001 and ending December 31, 2004.
Co-chair organizer for MOTPA06 conference at Univ. of Waterloo, July, 2006.
Program Chair for ICCOPT II, to be held at McMaster University, August, 2007.
Chair Organizing Committee, SIAM Optimization Meeting, Stockholm, 2005.
Co-chair Organizing Committee, SIAM Optimization Meeting, Stockholm, 2005.
Associate Editor Mathematical Programming.
Associate Editor SIOPT (SIAM J. of Optimization).
Associate Editor of Operations Research, 1996-98.
Associate Editor, SIAM Book Series on Fundamentals of Algorithms
Associate Editor, Optimization and Engineering, OPTE, (Kluwer)
Associate Editor, J. of Computational Optimization and Applications , COAP,
Associate Editor, of the Canadian Applied Mathematics Quarterly, CAMQ,
Associate Editor, Algorithmic Operations Research, (FACETS Inc.) URL: <http://punnen.unbsj.ca/AOR/AOR.htm>.
Associate Editor, J. of Combinatorial Optimization, JOCO, (Kluwer)
Associate Editor, Canadian Applied Mathematics Quarterly (July/02)
Associate Editor, American J. of Mathematical and Management Sciences
Associate Editor, Special Issue in Mathematical Programming on Fields Workshop in Memory of Jos Sturm
Associate Editor, Special Issue in Linear Algebra and its Applications, Regina ILAS Conference
Invited Associate editor, "Algorithmic Operations Research, FACETS
Editorial Advisory Board of The Encyclopedia of Optimization, Kluwer
Many invited plenary talks and also organizer of several conferences. More details are available on my WWW home page.
Member of the Division of Mathematics for Industry and Commerce, University of Waterloo
Joint organizer of several workshops on semidefinite programming and optimization, 1993 (DIMACS), 1996 (Fields), 2000 April and August (Fields), and Waterloo, 2004.
SIAG Prize Committee in Numerical Linear Algebra, 1991-92.
Invited editor for special issue on Convex Analysis in Mathematical Programming, 1993
Invited editor for special issue in honour of Ingram Olkin's birthday in Linear Algebra and its Applications, 1994.
Invited editor for special issue on Semidefinite Programming, in Mathematical Programming, 1995

Editor of special issue on Semidefinite Programming in J. Global Optimization, 1997.

Editor of Handbook on Semidefinite Programming, Kluwer, 2000.

Invited editor for special issue on Semidefinite Programming, in Mathematical Programming, 2005

Referee of approximately 12 papers per year

Math Reviews for 4 papers per year

Reviews for promotion and tenure and grant applications for approximately 4 per year.

Research and Publications:

A list of publications (including student theses) is included below. A record of my various research activities, talks, and publications is kept on my home page with URL

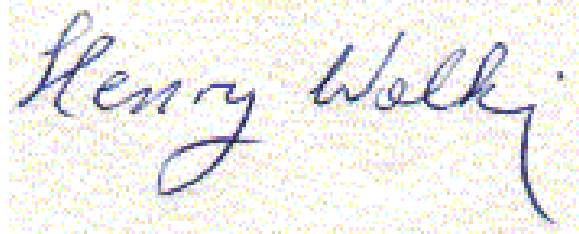
<http://orion.math.uwaterloo.ca/~hwoikowi/>. A list of publications (with abstracts and links to ps files) can be obtained with URL:

<http://orion.math.uwaterloo.ca/~hwoikowi/henry/reports/ABSTRACTS.html>. A complete list of publications can be obtained with:

<http://orion.math.uwaterloo.ca:80/~hwoikowi/henry/reports/refpubl/node1.html>. Plenary talks, invited courses and other presentations can be obtained with:

<http://orion.math.uwaterloo.ca:80/~hwoikowi/henry/reports/talks.d/talks.html>

Signature,

A handwritten signature in cursive script that reads "Henry Wolkowicz". The signature is written in black ink on a light-colored, textured background.

Henry Wolkowicz

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[14] [4] [3] [2] [1]

Publications and Student Theses

- [1] R. KUMAR. Bounds for eigenvalues. Master's thesis, University of Alberta, 1984. 3, 6
- [2] C. SCHOETTLE. The teaching assignment problem. Master's thesis, Emory University, 1985. 3, 6
- [3] P. STEPHAN. An explicit solution to the quadratic dynamic programming problem. Master's thesis, Emory University, 1985. 3, 6
- [4] JOE LUND. Optimal vehicle replacement policy. Master's thesis, University of Waterloo, 1988. 3, 6
- [5] Q. Zhao. Measures for least change secant methods. Master's thesis, University of Waterloo, 1993. 3, 6
- [6] S.E. KARISCH. Trust regions and the quadratic assignment problem. Master's thesis, University of Waterloo, 1992. 3, 6
- [7] S. Kruk. Semidefinite programming applied to nonlinear programming. Master's thesis, University of Waterloo, 1996. 3, 6
- [8] C. Fortin. A survey of the trust region subproblem within a semidefinite framework. Master's thesis, University of Waterloo, 2000. 3, 6
- [9] M. FROH. Trust region subproblems and linear least-squares regularization. Master's thesis, University of Waterloo, 2003. 3, 6
- [10] K. SCHAECKE. Essay on: The Kronecker product. Master's thesis, University of Waterloo, 2004. 3, 6
- [11] O. Grodzevich. Regularization using a parameterized trust region subproblem. Master's thesis, University of Waterloo, 2004. 3, 6
- [12] Y. Ding. On efficient semidefinite relaxations for quadratically constrained quadratic programming. Master's thesis, University of Waterloo, 2007. 3, 6
- [13] X. Cui. Computing the nearest correlation matrix using difference map method. Master's thesis, University of Waterloo, 2010. 3, 6
- [14] S.W. HADLEY. *Continuous Optimization Approaches to the Quadratic Assignment Problem*. PhD thesis, University of Waterloo, 1989. 3, 6
- [15] Q. Zhao. *Semidefinite Programming for Assignment and Partitioning Problems*. PhD thesis, University of Waterloo, 1996. 3, 6
- [16] S. Kruk. *High Accuracy Algorithms for the Solutions of Semidefinite Linear Programs*. PhD thesis, University of Waterloo, 2001. 3, 6
- [17] M.F. Anjos. *New Convex Relaxations for the Maximum Cut and VLSI Layout Problems*. PhD thesis, University of Waterloo, 2001. 3, 6
- [18] H. Wei. *Numerical Stability in Linear Programming and Semidefinite Programming*. PhD thesis, University of Waterloo, 2006. 4, 6
- [19] N. Krislock. *Semidefinite Facial Reduction for Low-Rank Euclidean Distance Matrix Completion*. PhD thesis, University of Waterloo, 2010. 4, 6
- [20] H.H. Bauschke, R.S. Burachik, P.L. Combettes, V. Elser, D.R. Luke, and H. Wolkowicz, editors. *Fixed-Point Algorithms for Inverse Problems in Science and Engineering*, volume 49 of *Springer Optimization and Its Applications*. Springer, 2011. 6
- [21] R. Bhatia, R. Guralnick, S. Kirkland, and H. Wolkowicz, editors. *12th ILAS Conference Proceeding, Regina 2005*, volume 421,1. Elsevier, 2007. Held in Regina, SK, June 26–29,

2005. 6

- [22] R. Bhatia, R. Guralnick, S. Kirkland, and H. Wolkowicz. Preface to the 12th ILAS Conference Proceedings, Regina 2005. *Linear Algebra Appl.*, 421(1):1–2, 2007. Held in Regina, SK, June 26–29, 2005. 6
- [23] E. Andersen, E. de Klerk, L. Tunçel, H. Wolkowicz, and S. Zhang, editors. *Large Scale Nonlinear and Semidefinite Programming*, volume 109, 2-3, Ser. B. North-Holland Publishing Co., Amsterdam, 2007. Dedicated to the memory of Jos Sturm, Math. Programming, Ser. B. 6
- [24] E. ANDERSEN, E. de Klerk, L. Tunçel, H. Wolkowicz, and S. ZHANG. Foreword: special issue on large-scale nonlinear and semidefinite programming. *Math. Program.*, 109(2-3, Ser. B):207–209, 2007. 6
- [25] P. Pardalos and H. Wolkowicz, editors. *New approaches for hard discrete optimization*. Springer, Norwell, MA, 2002. Papers from the FIELDS Workshop on Novel Approaches to Hard Discrete Optimization held at the University of Waterloo, Waterloo, ON, April 26–28, 2001, *J. Comb. Optim.* **6** (2002), no. 3. 6
- [26] P. Pardalos and H. Wolkowicz, editors. *Novel approaches to hard discrete optimization*, volume 37 of *Fields Institute Communications*, Providence, RI, 2003. American Mathematical Society. Papers from the workshop held at the University of Waterloo, Waterloo, ON, April 26–28, 2001. 6
- [27] P. Pardalos and H. Wolkowicz, editors. *Topics in Semidefinite and Interior-Point Methods*, The Fields Institute for Research in Mathematical Sciences, Communications Series, Providence, RI, 1998. American Mathematical Society. 6
- [28] P. Pardalos and H. Wolkowicz, editors. *Semidefinite Programming and Interior-Point Approaches for Combinatorial Optimization Problems*. Kluwer Academic Publishers, Hingham, MA, 1998. Papers from the workshop held at the University of Toronto, Toronto, ON, May 15–17, 1996, *J. Comb. Optim.* **2** (1998), no. 1. 6
- [29] M.L. OVERTON and H. Wolkowicz, editors. *Semidefinite Programming*. North-Holland Publishing Co., Amsterdam, 1997. Dedicated to the memory of Svatopluk Poljak, Math. Programming **77** (1997), no. 2, Ser. B. 6
- [30] F. PUKELSHEIM, G. P. H. STYAN, H. Wolkowicz, and I. ZABALLA, editors. *Special Issue Honoring Ingram Olkin*. Elsevier Science Inc., 1994. *Linear Algebra and Its Applications* **199** (1994). 6
- [31] P. Pardalos and H. Wolkowicz, editors. *Quadratic assignment and related problems*. American Mathematical Society, Providence, RI, 1994. Papers from the workshop held at Rutgers University, New Brunswick, New Jersey, May 20–21, 1993. 6
- [32] H. Wolkowicz, R. Saigal, and L. Vandenberghe, editors. *Handbook of semidefinite programming*. International Series in Operations Research & Management Science, 27. Kluwer Academic Publishers, Boston, MA, 2000. Theory, algorithms, and applications. 6
- [33] N. Krislock and H. Wolkowicz. Euclidean distance matrices and applications. In *Handbook on Semidefinite, Cone and Polynomial Optimization*, number 2009-06 in International Series in Operations Research & Management Science, pages –. Springer-Verlag, 2011. 6
- [34] H. Wolkowicz. Generating eigenvalue bounds using optimization. In *Nonlinear analysis and variational problems*, volume 35 of *Springer Optim. Appl.*, pages 465–490. Springer, New York, 2010. 6
- [35] H. Wolkowicz. Semidefinite programming. In Leslie Hogben, editor, *CRC Handbook of Linear Algebra (HLA)*, pages 51–1 – 51–13. CRC Press, Ba-

con Raton, Fl, 2007. Choice Magazine Outstanding Academic Title for 2008, URL:http://www.crcpress.com/shopping_cart/products/product_detail.asp?sku=C5106&parent_id=&pc=6

- [36] H. Wolkowicz. Semidefinite programming approaches to the quadratic assignment problem. In *Nonlinear assignment problems*, volume 7 of *Comb. Optim.*, pages 143–174. Kluwer Acad. Publ., Dordrecht, 2000. 6
- [37] A. Alfakih and H. Wolkowicz. Matrix completion problems. In *Handbook of semidefinite programming*, volume 27 of *Internat. Ser. Oper. Res. Management Sci.*, pages 533–545. Kluwer Acad. Publ., Boston, MA, 2000. 6
- [38] Y.E. Nesterov, H. Wolkowicz, and Y. Ye. Semidefinite programming relaxations of nonconvex quadratic optimization. In *Handbook of semidefinite programming*, volume 27 of *Internat. Ser. Oper. Res. Management Sci.*, pages 361–419. Kluwer Acad. Publ., Boston, MA, 2000. 6
- [39] S. Kruk and H. Wolkowicz. Sequential, quadratic constrained, quadratic programming for general nonlinear programming. In *Handbook of semidefinite programming*, volume 27 of *Internat. Ser. Oper. Res. Management Sci.*, pages 563–575. Kluwer Acad. Publ., Boston, MA, 2000. 6
- [40] H. Wolkowicz. Semidefinite and Lagrangian relaxations for hard combinatorial problems. In M.J.D. Powell, editor, *Proceedings of 19th IFIP TC7 Conference on System Modelling and Optimization, July, 1999, Cambridge*, pages 269–309. Kluwer Academic Publishers, Boston, MA, 2000. 6
- [41] H. Wolkowicz. Semidefinite programming. In P.M. Pardalos and M.G.C. Resende, editors, *Handbook of Applied Optimization*, pages 40–50. Oxford University Press, New York, 2002. 6
- [42] H. Wolkowicz. Duality for semidefinite programming. In *Encyclopedia of Optimization*. Kluwer Academic Publishers, Boston, MA, 2001. 6
- [43] H. Wolkowicz. Book review of: *Optimization: Insights and Applications*, by Brinkhuis and Tikhomirov. *IEEE Control Systems Magazine*, page to appear, 2006. 6
- [44] M-H. Lin and H. Wolkowicz. An eigenvalue majorization inequality for positive semidefinite block matrices: In memory of Ky Fan. *Linear and Multilinear Algebra*, special issue in Memory of Ky Fan(CORR 2011-04):to-appear. 6
- [45] Y-L. Cheung, S. Schurr, and H. Wolkowicz. Preprocessing and reduction for degenerate semidefinite programs. Technical Report CORR 2011-02, URL: www.optimization-online.org/DB_HTML/2011/02/2929.html, University of Waterloo, Waterloo, Ontario, 2011. 6
- [46] B. Alipanahi, N. Krislock, A. Ghodsi, H. Wolkowicz, L. Donaldson, and M. Li. SPROS: An SDP-based protein structure determination from NMR data. In URL: [URL: compbio.cs.sfu.ca/recomb2011/index.html](http://compbio.cs.sfu.ca/recomb2011/index.html), Waterloo, Ontario, 2011. poster session at RE-COMB2011. 6
- [47] X.V. Doan and H. Wolkowicz. Numerical computations and the ω -condition number. Technical Report CORR 2011-03, University of Waterloo, Waterloo, Ontario, 2011. submitted in July, 2011. 6
- [48] F. Burkowski, Y-L. Cheung, and H. Wolkowicz. Semidefinite programming and side chain positioning. Technical Report CORR 2011, in progress, University of Waterloo, Waterloo, Ontario, 2011. 6
- [49] X.V. Doan, S. Kruk, and H. Wolkowicz. A robust algorithm for semidefinite programming.

- Optim. Methods Softw.*, :1–27, 2011. submitted in November, 2010, accepted June, 2011, available journal electronical version DOI 10.1080/10556788.2011.610456. 6
- [50] Y-L. Cheung, X.V. Doan, and H. Wolkowicz. Underdetermined least squares with positive semidefinite constraint. Technical Report CORR ? 2010, University of Waterloo, Waterloo, Ontario, 2010. inprogress. 6
- [51] Y. Ding, D. GE, and H. Wolkowicz. On equivalence of semidefinite relaxations for quadratic matrix programming. *Math. Oper. Res.*, 36(1):88–104, 2011. 6
- [52] Y-L. Cheung, N. Krislock, and H. Wolkowicz. Facial reduction for compressive sensing. Technical Report CORR 2010, University of Waterloo, Waterloo, Ontario, 2010. in progress. 6
- [53] N. Krislock, F. Rendl, and H. Wolkowicz. Noisy sensor network localization using semidefinite representations and facial reduction. Technical Report CORR 2010-01, University of Waterloo, Waterloo, Ontario, 2010. 6
- [54] N. Krislock and H. Wolkowicz. Explicit sensor network localization using semidefinite representations and facial reductions. *SIAM Journal on Optimization*, 20(5):2679–2708, 2010. 6
- [55] A. Alfakih, M.F. Anjos, V. Piccialli, and H. Wolkowicz. Euclidean distance matrices, semidefinite programming, and sensor network localization. *Portug. Math.*, 68(1):53–102, 2011. 6
- [56] L. Tunçel and H. Wolkowicz. Strong duality and minimal representations for cone optimization. Technical Report CORR 2008-07, University of Waterloo, Waterloo, Ontario, 2008. under revision. 6
- [57] Y. Ding, N. Krislock, J. Qian, and H. Wolkowicz. Sensor network localization, Euclidean distance matrix completions, and graph realization. volume 11, pages 45–66, 2010. 6
- [58] Y-L. Cheung and H. Wolkowicz. Underdetermined least squares with positive semidefinite constraint. Technical Report CORR 2010, University of Waterloo, Waterloo, Ontario, 2010. in progress. 6
- [59] V. Piccialli and H. Wolkowicz. Solution to problem 34-6.1. *IMAGE-The Bulletin of the International Linear Algebra Society*, 35:33–34, 2005. 6
- [60] M.F. Anjos, M. Desroches, A. Haque, O. Grodzevich, H. Wei, and H. Wolkowicz. Multi-stage investment decision under contingent demand for networking planning. In *Proceedings of the 2006 IEEE GLOBECOM Conference in San Francisco*. accepted June/06, 2006. 6
- [61] Y. Ding, N. Krislock, J. Qian, and H. Wolkowicz. Sensor network localization, Euclidean distance matrix completions, and graph realization. *Optim. Eng.*, 11(1):45–66, 2010. 6
- [62] N. Krislock, V. Piccialli, and H. Wolkowicz. Robust semidefinite programming approaches for sensor network localization with anchors. Technical Report CORR 2006-12, University of Waterloo, Waterloo, Ontario, 2006. URL:orion.uwaterloo.ca/~hwoikowi/henry/reports/ABSTRACTS.html#sensorKPW. 6
- [63] M. Potapchik, L. Tunçel, and H. Wolkowicz. Large scale portfolio optimization with piecewise linear transaction costs. *Optimization Methods and Software*, 23(6):929–952, 2008. 6
- [64] Y. Ding and H. Wolkowicz. A low-dimensional semidefinite relaxation for the quadratic assignment problem. *Math. Oper. Res.*, 34(4):1008–1022, 2009. 6
- [65] A. Alfakih and H. Wolkowicz. Necessary and sufficient trace inequalities for Euclidean distance matrices. *Linear and Multilinear Algebra*, 55(5):499–506, 2007. 6
- [66] O. Grodzevich and H. Wolkowicz. Regularization using a parameterized trust region sub-

- problem. *Math. Programming*, 116((1-2)):193–220, 2009. 6
- [67] M. Gonzalez-Lima, H. Wei, and H. Wolkowicz. A stable primal-dual approach for linear programming under nondegeneracy assumptions. *Comput. Optim. Appl.*, 44(2):213–247, 2009. 6
- [68] S. Al-Homidan and H. Wolkowicz. Approximate and exact completion problems for Euclidean distance matrices using semidefinite programming. *Linear Algebra Appl.*, 406:109–141, 2005. 6
- [69] H. Wei and H. Wolkowicz. Generating and solving hard instances in semidefinite programming. *Math. Programming*, 125(1):31–45, 2010. 6
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