

Curriculum Vitae

Dr. Leonid Faybusovich
Department of Mathematics
University of Notre Dame
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Personal Data

U.S.A. Citizen.

Educational History

Harvard University, Cambridge, Massachusetts

Dates Attended: September 1989 - June 1991

Ph.D., 1991

Research Interests

Optimization, Control Theory.

Grants

1. NSF grant 1995-1998
2. NSF grant 1998-2001
3. NSF grant 2001-2004
4. NSF grant 2004-2007

Visiting Research Activities

1. Visiting Professor at the Royal Institute of Technology, Stockholm, Sweden, september 1994-july 1995
2. Visiting researcher at Australian National University, december 1994- february 1995.
3. Fellow in the "Research in Pairs" (RiP) program at the Mathematische Forschungsinstitut Oberwolfach, Germany, July,1996.
4. Visiting researcher at MSRI , Berkeley, October 1998
5. Visiting researcher at Osaka University , june 1999
6. Visiting researcher at Chinese University of Hong Kong, february-april, 2001.
7. Visiting professor at Institute of Statistical Mathematics, Tokyo, Japan, june-november, 2001
8. Visiting professor at Institute of Statistical Mathematics, Tokyo, Japan, June-August, 2004.

Work Experience

9/99- present Professor, University of Notre Dame

9/94 - 9/99 Associate Professor, University of Notre Dame

9/91-9/94 Assistant Professor, University of Notre Dame

9/89-9/91 Research Assistant, Harvard University

Professional activities

Organizer of a special session on optimization and numerical analysis, Meeting of AMS, Notre Dame, April 2000

Organizer of a special session on Jordan algebras in optimization, Mathematical programming Symposium, Atlanta, August 2000.

Organizer of an invited special session on geometric aspects of convex programming, 19th International Symposium on Mathematical Programming, Rio de Janeiro, August, 2006.

Organizer of a special session on new developments in optimization, Meeting of AMS, Notre Dame, April, 2006

Ph D and Master students

R. Arana , Ph D , August , 2000.

T. Mouktonglang, Ph D, August, 2004.

Y. Lu , M Sc , January 2005.

C. Vaidyanathan, M Sc, August 2006.

H. Fang (jointly with P. Antsaklis), M. Interdisc. Appl. Math., August 2006.

Professional Affiliations:

American Mathematical Society, Member.

Mathematical Programming Society, Member

Editorships:

Associate Editor of the SIAM Journal on Optimization, 1996-2002

Associate Editor of the SIAM Journal on Control and Optimization, 1999-2002.

Associate Editor of Optimization Letters, 2006-present.

Publications:

1. Wolfe's algorithm for infinite-dimensional quadratic programming problems, Eng. Cybernetics 20 (1983), 20-30.

2. The simplex-method in coordinate-free formulation, Cybernetics 19 (1983), 247-252.

3. Application of a reduction method to the analysis of linear dynamical systems with phase constraints, Automation and Remote control, 43 (1983),pp.1014-1020.

4. Linear dynamic systems with symmetries, Automation and Remote Control 44,(1983),pp. 617-623.

5. The dual simplex-method: the infinite-dimensional case, Cybernetics 20 (1984),124-130.

6. Existence and uniqueness of extremal solutions of the Riccati equation and symplectic geometry, Functional Analysis and Its Applications, 19(1985), 73-75.

7. On the symplectic structure of the operator Riccati equation, *Kibernetika i Vychislitel'naya Tekhnika*, 65 (1985), 62-68 (in Russian).
8. Stabilization of Infinite-dimensional linear dynamical systems by the Kalman-Letov method, *Automation and Remote Control*, 46 (1985), 182-188.
9. The Riccati equation, the multidimensional Euler equation and isospectral deformations, *Kibernetika i Vychislitel'naya Tekhnika* 69 (1986), 37-40 (in Russian).
10. Algebraic Riccati equation and symplectic algebra, *International Journal of Control*, 43 (1986), 781-792.
11. Generalized Toda flows, the Riccati equations on Grassmannian and the QR-algorithm, *Functional Analysis and its Applications*, 21, No. 2(1987), pp. 88-89.
12. Analytic Design of a Linear Controller and a multidimensional counterpart of the Dynamic Rigid body equations, *Automation and Remote Control*, 48, No. 7 (1987), Part 1, 900-907.
13. Matrix Riccati inequality: existence of solution, *Systems and Control Letters* 9 (1987), 59-64.
14. Explicitly solvable nonlinear optimal control problems, *International Journal of Control* 48, (1988), 2507-2526.
15. Hamiltonian formalism for nonholonomic dynamical systems related to generalized Toda flows, *Global Analysis and nonlinear equations. Voronezh* ((1988), 167-171. (In Russian).
16. QR-algorithm and Generalized Toda flows, *Ukrainian Mathematical Journal* 41, No. 7 (1989), 944-952.
17. Collective Hamiltonian Method in Optimal Control problems, *Cybernetics* 25, No. 2 (1989), 230-237. 1989
18. QR-type factorizations, the Yang-Baxter equation and an eigenvalue problem of control theory, *Linear Algebra and Its Applications*, 122/123/124 (1989), 943-971.
19. Simplex-method and Groups generated by reflections, *Acta Applicandae Mathematicae* 20, No. 3, (1990), 231-245.
20. Mechanics, Control and Symplectic Geometry, *Kibernetika i Vychislitel'naya Tekhnika*, 85 (1990), 38-41, in Russian.
21. Toda Flows, Inverse Spectral Transform and Realization Theory (with R.W. Brockett), *Systems and Control Letters*, 16 (1991), 79-88.
22. Hamiltonian Structure of Dynamical Systems which Solve Linear Programming Problems, 53 (Nos. 2 - 4) *Physica D*, (1991), 217-232.
23. Dynamical Systems which solve optimization problems with linear constraints, *IMA Journal of Mathematical Control and Information*, 8(1991), 135-149.
24. Interior-point methods and Entropy, *Proceedings of the 30th Conference on Decision and Control*, 3 (1991), 2094-2095.
25. A Hamiltonian QR-algorithm for the Solving the Algebraic Riccati Equation and Hessenberg Hamiltonian matrices, *Proceedings of ACC conference*, p. 2441-2442. Boston, 1991.
26. Toda Flows and Isospectral manifolds, *Proceedings of American Mathematical Society*, Vol 115, no.

3, 837-849, (1992)

27.Reduction to Generalized Hessenberg Form and Inverse Spectral Problem, *Linear Algebra and its Applications* 165:71-92 (1992)

28. Rutishauser Approach to Eigenvalue Problems: Realization theory viewpoint , *Proceedings of the International Symposium on implicit and nonlinear systems*,pp 108-112

29.Inverse Problems for Orthogonal Matrices, Toda flows, and Signal Processing (with G.Ammar and W.Gragg), *Proceedings of the 31st IEEE conference on Decision and Control*, December 16-18 , pp 1488-1493, 1992

30. Dynamical Systems that solve linear programming Problems, *Proceedings of the 31st IEEE conference on Decision and Control* , pp 1626-1631, 1992

31. Hamiltonian and System-theoretic Properties of the HR-algorithm, *Journal of Mathematical Systems, Estimation, and Control*, Vol. 3, No. 2,1993, pp. 129-146.

32. On the phase portrait of the Karmarkar's flow, *Computation and Control III* (K. Bowers, J. Lund Ed.), Birkhhauser, 1993, pp 203-210.

33. On the Rutishauser's Approach to Eigenvalue Problems, *Linear Algebra in Contro Theory*, B. Wyman and P. Van Dooren Ed.,Springer Verlag, 1994, pp 87-102.

34.Rational functions, Toda flows, and LR-like algorithms, *Linear Algebra and its Applications*, Vol. 203-204, pp 359-381 (1994).

35. A Hamiltonian formalism for convex optimization problems, *Proceedings of 14th IMACS World Congress on Computational and Applied Mathematics*, 1994, Vol. 1, pp 171-174.

36. On the linearization of the LR-algorithm, *Systems and Networks: Mathematical Theory and Applications*, Editors U. Helmke, R. Mennicken and J.Saurer, Akademie Verlag, Berlin, 1994, pp 673-676.

37. Quadratic Semi-definite Programming: Theory and Applications, *Proceedings of the Workshop "Computer-Intensive Methods in Control and Signal Processing"*, Editors L. Kulhava, M. Karney and K. Warwick, Prague, 1994, pp 159-166, publisher, Institute of Information theory and Automation, Academy of Sciences of Czech Republic.

38. Gibbs Variational Principle, Gradient Flows and Interior-point Methods, 1994, Vol. 3, pp 99-111, Fields Institute Communications.

39. Dikin's algorithm for matrix linear programming problems. In:*Lecture notes in control and information sciences*, vol. 197, J.Henry and J.Pavon eds., pp.237-247, New York,Springer-Verlag.

40.On a matrix generalization of affine-scaling vector fields, *SIAM Journal of Matrix Analysis and Applications* 16(3),pp.886-897 (1995).

41. A Hamiltonian structure for generalized affine-scaling vector fields, *Journal of Nonlinear Science*, vol.5 , pp.11-28(1995).

42. A Hamiltonian formalism for optimization problems, *Journal of Mathematical Systems, Estimation and Control* 5(3), pp.367-370(1995).

43. Semi-definite programming: a path-following algorithm for a linear-quadratic functional , SIAM Journal on Optimization, vol. 6,no 4, pp. 1007-1024,1996).
- 44.Separation Theorem for Linearly Constrained LQG Optimal Control (with A. Lim and J. Moore) Systems and Control letters, vol. 28, no.4, pp. 227-237 , 1996.
45. Optimization and Dynamical Systems (book Review), IEEE Transactions on Automatic Control, vol. 41, no. 5, pp.769 (1996)
46. On Explicitly Solvable Gradient Systems of Moser-Karmarkar Type. (with Y.Nakamura) , Journal of Mathematical Analysis and Appl., vol. 205, 88-106(1997)
47. Infinite Dimensional Quadratic Optimization: Interior-Point Methods and Control Applications.(with J.Moore) . Journal of Appl. Math and Opt. , vol.36, pp. 43-66, 1997
- 48.A long-step path-following algorithm for a quadratic programming problem in a Hilbert space. (with J.Moore) Journ. Opt. Theory and Appl., vol. 95, no. 3, pp. 615-635 (1997)
49. Linear systems in Jordan algebras and primal-dual interior-point algorithms, Journal of computational and applied mathematics, vol. 86, pp. 149-175, 1997.
50. Euclidean Jordan algebras and Interior-point algorithms , J. Positivity , vol.1 , pp. 331-357 (1997)
- 51.Infinite-dimensional semidefinite programming:regularized determinants and self-concordant barriers , Fields Institute Communications, vol. 18, pp.39-49 (1998).
52. Dikin-type Algorithms for Dextrous Grasping Force Optimization (with M. Bass and J. Moore), Int . Journ. Robotics Research, vol. 17, pp. 831-840 (1998).
53. On Schur flows (with M. Gekhtman), J. Phys. A: Math. Gen. 32(1999) 4671-4680.
- 54.Elementary Toda orbits and integrable lattices (with M. Gekhtman), J. Math. Phys., 41(2000), 2905-2921.
55. Poisson brackets on rational functions and multi-Hamiltonian structure for integrable lattices (with M. Gekhtman), Phys. Lett. A 272(2000), 236-244.
56. Inverse Moment Problem for Elementary Orbits (with M. Gekhtman), Inverse Problems, 17(2001), 1295-1306.
57. A long-step primal-dual algorithm for the symmetric programming problem (with R. Arana), System and Control letters,vol. 43 (2001), 3-7.
58. Power control under finite power constraints, Communications in Information and Systems, vol. 1(2001), no. 4,pp. 395-406.
59. A Jordan-algebraic approach to potential-reduction algorithms, Math. Zeitschrift, vol. 239(2002), 117-129.
60. Self-concordant barriers for cones generated by Chebyshev systems, SIAM J. Opt., vol. 12(2002), no. 3 pp. 770-781.
61. On Nesterov's approach to semi-infinite programming, Acta. Appl.Math., vol. 74 (2002),pp. 195-215.
62. Simultaneous diagonalization on simple Euclidean Jordan algebras and its applications (with Y. Lim

and J. Kim), Forum Math. 15(2003), 639-644.

63. Some control-theoretic applications of second-order cone programming (with T.Mouktonglang), Proceedings of the American Control Conference, Denver, Colorado, June 4-6, 2003, pp. 4549-4554.

64. Finite-rank perturbation of Linear-quadratic control problem (with T. Mouktonglang), Proceedings of the American Control Conference, Denver, Colorado, June 4-6, 2003, pp. 5347-5350.

65. Global optimization of homogeneous polynomials on the simplex and on the sphere. In: Frontiers in Global Optimization, C. Floudas and P. Pardalos, Eds., pp. 109-121, Kluwer, 2003.

66. Primal-dual algorithms and infinite-dimensional Jordan algebras of finite rank (with T. Tsuchiya), Mathem. Programming, vol. 97 (2003), Ser.B, pp. 471-493.

67. Calculation of Universal barrier functions for cones generated by Chebyshev systems over finite sets (with M. Gekhtman), SIOPT, vol. 14, no 4, pp. 965-979.

68. Euclidean Jordan algebras and generalized affine-scaling vector fields

69. Multi-Target Linear-Quadratic Control Problem and Second-order Cone Programming (with T. Mouktonglang), Systems and Control letters, vol. 52, pp. 17-23, 2004.

70. Semidefinite descriptions of cones defining spectral mask constraints Research, European Journal of Operations Research, vol. 169, 1207-1221 (2006).

71. Implementation of Infinite Dimensional Interior Point Method for Solving Multi-criteria Linear Quadratic Control Problem (with T.Mouktonglang and T. Tsuchiya), Optimization Methods and Software, vol. 21, pp. 315-341(2006).

72. Jordan-algebraic aspects of non-convex optimization (with Ye Lu), Appl. Math. Optim., vol. 53, pp. 67-77 (2006).

73. Jordan-algebraic approach to convexity theorems for quadratic mappings, SIOPT, no 2, pp. 558-576 (2006).

74. Numerical experiments with universal barrier functions (with T. Mouktonglang and T. Tsuchiya) (to appear in Computational Optimization and Applications).

Addresses:

1991

Interior-point methods and Entropy, 30th Conference on Decision and Control, Brighton, England, December 12-14, 1991

1992

A Poisson structure on the manifold of rational functions and HR-type algorithms of numerical analysis, The Fields Institute for

Research in Mathematical Sciences workshop, University of Cincinnati, Ohio, March 29-31.

Gibbs Variational Principle, Gradient Flows and Interior - Point Methods, The Fields Institute for Research in Mathematical Sciences, Toronto, Canada, Mar. 30

Hamiltonian Structure of dynamical systems which solve linear programming Problems, Dept. of Mathematics, Minnesota, June 1.

Flows on rational functions, realization theory and algorithms of numerical linear algebra, Institute of Mathematics and its Applications, Minnesota, June 3.

Hamiltonian formalism and Optimization theory, Fields Institute of Mathematics, Waterloo, Canada, June 19

A new interior-point method of linear programming, Computation and Control III, Bozeman, Montana, August 5.

Rutishauser approach to eigenvalue problems: control-theorist's viewpoint, NCSU Numerical Analysis Seminar, North Carolina State University, Department of Mathematics and Center for Research in Scientific Computation, November 10.

Decoding Goppa codes via H. Rutishauser's quotient-difference algorithm, Applied Analysis Seminar, Department of Mathematics, Ohio State, Columbus, Ohio, November 19.

1993

On the phase portrait of the Karmarkars's flow, Meeting of the American Mathematical Society: DeKalb, II, May 20-22, 1993.

Talk :Dikin's algorithm for matrix linear programming problems,

16th IFIP Conference on system modelling and Optimization, Compiègne (France) (July 8, 1993).

Talk Hamiltonian structure of generalized affine-scaling vector fields, Oberwolfach (Germany), July 28, 1993 [Geometric and Computational Methods in Mechanics].

Mathematical Theory of Networks and Systems, Regensburg, August 2-6, 1993 (Germany) - Chairperson of the invited session Geometric methods in Numerical Analysis, presented the talk: "On the Rutishauser's approach to eigenvalue problems".

Meeting Mathematics and Computation, Vancouver, Canada, August 8 - August 14, 1993. Talk: "Decoding Goppa codes via Rutishauser's algorithm" - August 9, 1993.

SIAM Conference "Linear algebra in control and Signal processing", August 15 - August 19 (Seattle). Talk: Isospectral flows in linear programming.

1994

Invited talk: "A Hamiltonian formalism for optimization problems",

Systems Research Centre, University of Maryland, March 15, 1994.

Organizer and chair of the invited session Dynamical Systems, Complexity and Optimization in 14th IMACS world congress on Computational and Applied mathematics, Atlanta, Georgia, July 11-15. Invited talk: "Hamiltonian formalism for convex optimization problems."

IEEE European Workshop "Computer Intensive Methods in Control and Signal Processing", September 7-9, Prague, Czech Republic, Invited speaker. Lecture entitled: Quadratic Semidefinite programming: theory and applications.

Invited colloquium talk: "Interior-point methods and control applications", Research School of Information Science and Engineering, Australian National University, Canberra, Australia, Dec. 6, 1994.

Invited talk: "Interior-point methods as a tool for solving control problems", Department of Mathematics, Royal Institute of Technology, Stockholm, Sweden, Sep.30, 1994.

1995

Invited talk:Hamiltonian Systems in Optimization. Laboratory of Applied Mathematics, Doshisha University, Kyoto, Japan, January 27, 1995.

Invited talk:"Interior-point methods in control theory", Department of Information Engineering, Chinese University of Hong Kong, June 1, 1995.

6th Stockholm Optimization days. Invited speaker. Lecture entitled: Infinite-dimensional quadratic optimization:interior-point methods and control applications. June 26-27, Stockholm, Sweden.

1996

7th Stockholm Optimization days. Invited speaker. Lecture entitled: Jordan algebras, Symmetric cones and interior-point methods. June 24-25, Stockholm, Sweden

Differential Geometric Seminar. Mathematical Institute, Colon,Germany. Invited talk: Geometry and comlexity of convex optimization. July 11.

W. Gragg's Fest, Naval Postgraduate School, Monterey, California, Nov. 1-Nov.2, 1996. Invited talk: Linear Systems in Jordan algebras and primal-dual interior-point algorithms

Semidefinite Programming and Interior-point Approaches for Combinatorial Optimization Problems. Workshop, Fields Institute, Toronto, Canada, May 15-17. Invited Speaker. Lecture entitled:Infinite-dimensional Semidefinite programming:Self-Concordant barriers and path-following algorithms.

1997

Jordan -algebraic generalization of the projection method. Invited talk. Department of Mathematics. Royal Institute of Technology. Stockholm, Sweden, August 22.

1998

Interior-point algorithms and numerical integration of affine-scaling vector fields. Applied and Interdisciplinary mathematics seminar. Ann Arbor, Department of Mathematics, University of Michigan, April 6.

A Jordan -algebraic approach to interior-point algorithms, Optimization 98, Coimbra , Portugal, July 19-july 21.

Interior-point algorithms and Euclidean Jordan algebras, Aug. 20 , International Congress of mathematicians, Berlin, Aug. 18 -27.

Towards dimension-independent complexity estimates for interior-point algorithms. Invited talk, Brockettfest, Harvard University, October 23.

1999

Schur Flows and Toda Flows, Colloquium talk, Department of Mathematical Sciences , Osaka University, June 4.

A Jordan-algebraic approach to potential-reduction algorithms , Invited lecture, Department of Applied Mathematics , Kyoto University, june 24

Lie-algebraic and Jordan -algebraic foundations of interior-point algorithms, invited lecture, august 4. Workshop on Lie-algebraic methods and applications, Wurzburg, Germany.

2000

A long-step primal-dual algorithm for symmetric programming problem, invited presentation, special session on numerical analysis and optimization, Notre Dame, april 2000.

Interior-point algorithms of optimization, colloquium talk, Department of Mathematics, Chulalongkorn University, Bangkok, Thailand , june 21

Schur flows, quadratic Poisson structures and biorthogonal polynomials, invited talk, Kansai seminar on integrable systems, Osaka University, Japan, june 28

Jordan-algebraic approach to interior-point algorithms of optimization, colloquium talk, Institute of statistical mathematics, Tokyo, Japan, july 4.

A long-step primal-dual algorithm for the symmetric programming problem , Atlanta, International Symposium on mathematical programming, August 8.

2001

Colloquium talk in National University of Singapore entitled "Self-concordant barriers for cones generated by Chebyshev systems". Two lectures on Jordan algebras for interior-point algorithms in the same University.

Colloquium talk "Interior-point algorithms for semiinfinite programming". Department of Mathematics, Hong Kong Polytechnic University, March 16.

Colloquium talk "New approaches to semiinfinite programming". Department of Systems engineering and engineering management, Chinese University of Hong Kong, March 28.

Colloquium talk "New approaches to semiinfinite programming", Institute of Statistical Mathematics, Tokyo, Japan, June 27.

Invited talk in Optimization Workshop at Tokyo Institute of Technology, Tokyo, Japan, june29-30: On Nesterov's approach to semi-infinite programming.

Invited talk in Symposium Mathematical Optimization Theory and Algorithms, Research Institute of Mathematical Sciences, Kyoto, Japan, july 18: Self-Concordant barriers for cones generated by Chebyshev systems.

Colloquium talk "Jordan algebras in Optimization", Korean National University, Department of Mathematics, Taegu, October 30.

Colloquium talk " Primal-dual algorithms and infinite-dimensional Jordan algebras", Science University of Tokyo, November 21.

Invited talk" Self-concordant barriers in optimization and matrix models of quantum field theory". Kansai Seminar on Integrable systems, Kyoto University, December 4.

Invited speaker in Symposium New Trends in Algorithms and Optimization, Kyoto, Japan, Dec. 9-13.

Talk:Self-concordant barriers for semi-infinite programming

2002

Invited speaker in Foundations of Computational Mathematics conference, Minneapolis, aug. 5-Aug. 14.

Talk: Infinite-dimensional second-order cone programming and control applications

2003

Conference:Frontiers in Global Optimization, Santorini, Greece, june 8-june 12. Talk: Global optimization of homogeneous polynomials on the simplex and on the sphere

Numerical analysis seminar , Technical University, Berlin, june 17. Invited talk: Global optimization of polynomials and cones of squares.

Seminar, Department of Mathematics, Chulalongkorn University, Bangkok, Thailand, july 22. Invited talk: Universal barrier functions in interior-point algorithms of optimization

Seminar, Institute of Statistical Mathematics, Tokyo, Japan, July 31. Invited talk: Calculation of universal barrier functions for cones generated by Chebyshev systems over finite sets. On Oct. 20

Colloquium talk: Universal barrier functions in interior-point algorithms of optimization, Department of Computational and Applied Mathematics, Rice University, Houston, Oct. 20

Invited talk: computation of universal barrier functions, School of Industrial Engineering, Georgia Tech, Atlanta,Oct. 24.

2004

Workshop High Performance Optimization Technique (Optimization and Polynomials), June 23-25, Amsterdam, Netherlands. Invited talk: cones of trigonometric polynomials.

Seminar, Department of Mathematics, Tokyo Institute of Technology, Tokyo, Japan, July 20. Invited talk: Global Optimization of polynomials on the simplex and on the sphere.

Seminar, Institute of Statistical Mathematics, Tokyo, Japan, August 24. Invited talk: Jordan algebras and interior-point algorithms of optimization.

2005

Conference on positive polynomials, CIRM,Lumini, France, March 14-March 18. Invited talk: Calculation of Universal barrier functions and cones of squares. (March 18)

Conference Foundations of Computational Mathematics, Santander, Spain, June 30-July 9. Invited talk:Implementation of Infinite-dimensional Interior-point method for solving multi-criteria Linear-Quadratic Control Problem. (July 4)

Conference IFORS 2005, Honolulu, July 11-July 15. Invited talk: Jordan-algebraic approach to convexity theorems for quadratic mappings. (July 12)

Tokyo University, Tokyo, Japan, July 19. Invited talk: Jordan-algebraic approach to convexity theorems.

2006

Workshop on semidefinite programming and its applications, Singapore, Jan. 11-Jan13. Invited talk: Symmetric relaxations for nonconvex optimization problems (January 12).

AMS meeting, Notre Dame, April. Talk: Symmetric relaxations and Applications.

19th International Symposium on Mathematical Programming, Rio de Janeiro, July 30-August 4. Invited talk: Symmetric relaxations of nonconvex optimization problems.

2007

Workshop "Convex optimization and applications in control theory, probability and statistics" (60 anniversary of A. Nemirovski), CIRM, Luminy, France, April 10-April 14. Invited talk: Jordan-algebraic aspects of optimization:randomization (April 13).

Workshop in Advances in Optimization (60 anniversary of M. Kojima), Tokyo Institute of Technology, Japan, April 21-April 23. Invited talk: several Jordan-algebraic aspects of optimization (April 20).