

Curriculum Vitae

Prof. i.R. Dr. Diethard Klatte
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2 December 2019

Personal information

Born 18 December 1950 in Berlin, Germany.
Nationality: German.

Academic degrees

1974 Diplom-Mathematiker, Institute of Mathematics, Humboldt University Berlin.
1977 Dr. rer. nat., Institute of Mathematics, Humboldt University Berlin
(*Untersuchungen zur lokalen Stabilität konvexer parametrischer Optimierungsaufgaben*).
1984 Habilitation: Dr. sc.nat. (*Beiträge zur Stabilitätsanalyse nichtlinearer Optimierungsprobleme*) and
Facultas docendi in Mathematical Optimization, Humboldt University Berlin.
1994 Venia legendi in Operations Research, University of Zurich.

Education, employment

1969-73 study of mathematics and **1973-76** doctoral study (supervisors: J. Guddat, F. Nozicka) of mathematics at the *Humboldt University Berlin*. **1976-85** *Institute of Mathematics of the Humboldt University Berlin*: Assistant (1976-80), Habilitation Aspirant (1980-82), Senior Assistant (1982-85). **1985-92** *Pedagogical University Halle (Saale)*: Associate Professor (Dozent) for Mathematical Analysis (1985-87), Professor for Mathematical Optimization (1987-92). **Since 1992** *Institute for OR (1992-2010) resp. IBW (since 2011) of the University of Zurich*: Postdoc (1992-93), Privatdozent for OR (since 1994), Senior Assistant (1993-2007) and Associate Professor for Mathematics for Economists (1995-2007), Ordinary Professor ad personam for Mathematics for Economists (2007-2016), Emeritus since 1 February 2016.

Languages

German, English, Russian.

Further education

09/78-06/79 post-doctoral studies in OR and optimization at the State University of St. Petersburg, Russia (supervisors: V.F. Demyanov, M.K. Gavurin und I.V. Romanovskii). **1982-83** postgraduate study in university teaching. **06/83-09/83** participant in the Young Scientists Summer Program at IASA Laxenburg, Austria.

Research interests

Optimization theory and methods, convex and variational analysis. In particular: parametric optimization and sensitivity analysis; analysis of set-valued and nonsmooth functions with applications to optimization, variational and equilibrium problems (including convergence analysis of Newton-type and penalty methods, iterate optimization, semi-infinite programs, programs with cone constraints, polynomial programs, programs with equilibrium constraints); error bounds in convex optimization.

Professional activities

Doctoral students

Gisbert Thiere, *Untersuchungen zum Vergleich und zur Berechnung von Fehlerschranken für lineare Ungleichungssysteme*, Dr. rer. nat., Pädagogische Hochschule Halle/Saale, 1989.

Stephan Bütikofer, *Generalized Newton-type methods for nonsmooth equations in optimization and complementarity problems*, Dr. sc., ETH Zürich, 2008.

Anna-Laura Haber Wickström, *Sensitivity Analysis of Semidefinite Programming Problems*, Dr. sc. nat., Universität Zürich, 2014.

Eleftherios Antonios Couzoudis, *Applications and Computational Methods for Generalized Nash Equilibria*, Dr. oec., Universität Zürich, 2016.

Editorial duties

Member of the Editorial Board *Convex Analysis*, since 1993.

Associate Editor *SIAM Journal on Optimization*, 2006–2014.

Member of the Editorial Board *Optimization*, 2003–2011.

Associate Editor *Operations Research Letters*, 2002–2011.

Editor, together with H.-J. Lüthi and K. Schmedders, *OR 2011 Proceedings*, Springer 2012.

Guest-Editor, together with D. Ward and J. Rückmann, Complete Volume 101 of *Annals of OR* 2001 (festschrift in honour of A.V. Fiacco).

Memberships in program/scientific committees (PC) of international conferences

PC *German Polish Conference on Optimization* (Bedlowo 2017, Wittenberg 2014, Moritzburg 2009)

Invited session organizer *EUROPT 2013 Workshop* (Florence 2013)

Invited session organizer *21th IMPS* (Berlin 2012)

PC *Operations Research 2011* (Zurich 2011)

Stream organizer (with S. Dempe, G. Feichtinger) *Operations Research 2011* (Zurich 2011)

PC *Advances in Optimization and Related Topics* (Barcelona 2010)

PC *8th EUROPT Workshop* (Aveiro/Portugal 2010)

PC *Parametric Optimization and Related Topics* (Karlsruhe 2010, Puebla 2002, Dubrovnik 1999, Enschede 1995, Güstrow 1991, Eisenach 1989, Plaue 1985)

PC *12th Workshop on Well-Posedness in Optimization and Related Topics* (Levico Terme 2009)

Invited session organizer *20th IMPS* (Chicago 2009)

PC *Approximation and Optimization in the Carribean* (San Andres Island 2008, Puebla 1995, Havanna 1993)

PC *NCP 07* (Rouen 2007)

Main Stream organizer (with T. Terlaky) *EURO XXII* (Prag 2007).

PC *Mathematical Methods in Economics and Industry* (Arnstadt 2005, Liberec 1998, Bardejov 1995)

Invited sessions organizer *22th TC7 Conference on System Modeling and Optimization* (Turin 2005)

PC *International Workshop on semi-infinite programming* (Hainan, Taiwan 2005)

Invited sessions organizer *17th IMPS* (Atlanta 2000)

PC *Operations Research 98* (Zürich 1998)

PC *Symposium on Mathematical Programming with Data Perturbations* (Washington D.C. 1998, 1997)

Section chairman *SOR 1997* (Jena 1997)

PC *German-French Conferences on Optimization* (Trier 1996, Dijon 1994)

Memberships in scientific committees of research programs

Research Programme *Variational Analysis and Optimization: Theory and Applications*, CRM Barcelona, September to December 2010.

Referee's reports for

Mathematical Programming, Journal of Optimization Theory and Applications, SIAM Journal on Optimization, SIAM Journal on Control and Optimization, Mathematics of Operations Research, Optimization, Computational Optimization and Applications, Journal of Global Optimization, Control and Cybernetics, Operations Research Letters, Annals of Operations Research, Mathematical Methods of Operations Research (ZOR), Set-Valued Analysis, SIAM Reviews, book publications by Springer, Kluwer, Teubner, Birkhäuser, Wiley, Elsevier, and others. Reviewer for *Mathematical Reviews*.

Reviews, evaluations, recommendations

Reviews for appointments as professors (Germany, USA, Switzerland, and other countries); evaluation of doctor's theses and habilitation theses, e.g., Humboldt-Universität Berlin, Technische Universität Chemnitz, Universität Leipzig, Universität Zürich, ETH Zürich, Univ. Milano, TU Bergakademie Freiberg, Miguel Hernandez Univ. Elche; evaluation of research projects for National Science Foundations (Germany, USA, Chile, Netherlands, Israel).

Membership in professional associations

Mathematical Optimization Society (MOS, formerly Mathematical Programming Society).
Society for Industrial and Applied Mathematics (SIAM).
SIAM Activity Group on Optimization.
Fachgruppe Optimierung (SIGOPT) der DMV.
Gesellschaft für Operations Research (GOR).
Schweizerische Vereinigung für Operations Research (SVOR).

Research results

Publications (see list of publications)

Presentations: summary

more than 100 papers at international conferences and workshops,
including plenary or semi-plenary talks, e.g., at

Workshop on Nonsmooth and Variational Analysis - ESI Vienna 2019 (Wien),
NOSTOP 2018 - WIAS-PGMO Workshop on Nonsmooth and Stochastic Optimization (Berlin),
Paraopt XI 2017 - 11th International Conference on Parametric Optimization and Related Topics (Prague),
GPCO 2017 - 7th German-Polish Conference on Optimization (Bedlowo/Poland),
ALEL 2016 - International Conference in Optimization and its Applications (Cartagena/Spain),
International Conference on Variational Analysis, Optimization and Quantitative Finance in honor of Terry Rockafellar's 80th Birthday (TERRY FEST 2015) (Limoges/France),
6th International Conference on Complementarity Problems 2014 (Berlin),
4th Workshop on Optimization and Variational Analysis 2010 (Elche, Spain),
16th Conference on Mathematical Methods in Economics and Industry 2009 (Ceske Budejovice),
Autumn School: Optimization and Multiphase Problems 2008 (Budapest/Hungary),
Parametric Optimization and Related Topics 2005 (Cairo/Egypt),
Well-Posedness in Optimization 2003 (Marseille-Luminy/France),
Well-Posedness in Optimization 2001 (Warsaw/Poland),
German-Polish Conference on Optimization 1999 (Zagan, PL),
Semi-Infinite Programming 1999 (Alicante/Spain),
Mathematical Programming with Data Perturbations 1998 (Washington DC),
11th International Baikal School-Seminar 1998 (Baikal, Russland),
Parametric Optimization and Related Topics 1997 (Tokyo/Japan),
Semi-Infinite Programming 1996 (Cottbus/D),
Mathematical Programming with Data Perturbations 1995 (Washington DC),
Mathematical Programming with Data Perturbations 1994 (Washington DC),
Parametric and Shape Optimization 1993 (Warschau, PL),
Parametric Optimization and Related Topics 1991 (Güstrow/D),
SOR 1991 (Trier, D)

more than 90 talks at colloquia of mathematical and OR institutes

in Germany, Switzerland, USA, Russia, Spain, Austria, Poland, England, Czech Republic, Slovakian Republic, Hungary, Bulgaria, Belgium.

Presentations: talks since 2000

On Newton-type methods for generalized equations, OR 2019, Dresden, 3-6 September 2019.

On extensions of Newton's method for equations and inclusions, Workshop on Nonsmooth and Variational Analysis, Erwin Schrödinger International Institute for Mathematics and Physics (ESI) Vienna, 28 January – 1 February 2019.

Isolated calmness of Hölder and Lipschitz type in nonlinear optimization, NOSTOP 2018 - WIAS-PGMO Workshop on Nonsmooth and Stochastic Optimization, Berlin, 26 June 2018.

Some extensions of the Frank-Wolfe theorem, Universität Wien, ISOR Colloquium, 4 June 2018.

On generalized Newton methods for equations and inclusions, SIGOPT 2018, Kloster Irsee, 21-23 March 2018.

Parametric optimization and variational problems involving polyhedral multifunctions, Paraopt XI - 11th International Conference on Parametric Optimization and Related Topics, Prague, 19-22 September 2017.

On Lipschitz and Hölder stability of stationary solutions to nonlinear optimization problems, 7th German-Polish Conference on Optimization, Bedlowo/Poland, 27 August - 01 September 2017.

Hölder and Lipschitz stability in nonlinear optimization - some new results, 2nd Central European Set-Valued & Variational Analysis Meeting, Jena/D, 3 December 2016.

Approximations and generalized Newton methods for equations and inclusions, OR 2016 Hamburg, 30 August - 2 September 2016.

Lipschitz and Hölder stability of stationary solutions, ALEL 2016 - International Conference in Optimization and its Applications, Cartagena/Spain, 6-8 June 2016.

Pseudo-smooth functions and Newton-type methods for nonlinear optimization and complementarity problems, 13th EUROPT Workshop on Advances in Continuous Optimization, Edinburgh, July 8-10, 2015.

Calm and locally upper Lipschitz multifunctions: Intersection mappings and applications in optimization, International Conference on Variational Analysis, Optimization and Quantitative Finance in honor of Terry Rockafellar's 80th Birthday (TERRY FEST 2015), Limoges/France 18-22 May 2015.

Calmness of the argmin mapping in parametric optimization problems, Swiss OR Days 2015, IBM Research Zurich 7-8 May 2015.

Intersection of calm multifunctions and its application to the argmin mapping, OR 2014, Aachen, 2-5 September 2014.

Calmness of solution mappings in parametric optimization problems, 6th International Conference on Complementarity Problems (ICCP 2014), Berlin, 4-8 August 2014.

Strong and metric regularity of generalized equations in constrained optimization, International Symposium on Applied Analysis, Zurich, 10-11 June 2014.

Calmness of feasible and optimal solutions in nonlinear programming, 6th German Polish Conference on Optimization, Wittenberg/D, 28 February - 4 March 2014.

Regularity of solution mappings in nonlinear optimization, Johannes-Kepler-Universität Linz, 11 February 2014.

Strong and metric regularity of generalized equations in nonlinear optimization, Mathematical Programming Seminar, CORE Louvain-la-Neuve, 31 October 2013.

Calmness of feasible and optimal solution maps for perturbed semi-infinite optimization problems, EUROINFORMS MMXIII, Rome, 1 - 4 July 2013.

Uniqueness of solutions under metric regularity of Karush-Kuhn-Tucker systems for cone constrained programs, 11th EUROPT Workshop on Advances in Continuous Optimization, Florence, 26-28 June 2013.

On Metric Regularity of Karush-Kuhn-Tucker Systems in Nonlinear Optimization, Kolloquium IOR-KIT, Karlsruher Institut für Technologie, 6 June 2013.

Aubin property and uniqueness of solutions in cone constrained optimization, OR 2012, Hannover/Germany, 4-7 September 2012.

Some notes on stability analysis via generalized derivatives, ISMP Satellite Meeting on Generalized Differentiation, Berlin, 25 August, 2012.

Metric regularity versus strong regularity for critical points of nonlinear optimization problems, 21st International Symposium on Mathematical Programming, Berlin, 19-24 August, 2012.

A class of nonsmooth Newton methods revisited, 17th International Conference Mathematical Methods in Economics and Industry, Berlin, 24-28 June, 2012.

Metric and strong regularity of generalized equations in nonlinear optimization, Mathematisches Kolloquium der Universität Trier, 14. Juni 2012.

Handling Set Constraints in Variational Problems like Usual Inequalities, SIAM Conference on Optimization, Darmstadt/Germany, 16-19 May, 2011.

Calmness of feasible and optimal solution maps in semi-infinite optimization, OR 2011, Zurich, 30 August - 2 September 2011.

Parametric optimization and nonsmooth Newton schemes for special $C^{1,1}$ programs, PAROPT X, Karlsruhe/Germany, 20-24 September 2010.

Parametric optimization and nonsmooth Newton schemes for generalized semi-infinite programs, 4th Workshop on Optimization and Variational Analysis (In honor of Professor Marco A. López), Elche/Spain, 14-16 June 2010.

Stability of solutions to Lipschitzian equations and nonlinear optimization problems, Colloquium, Department of Mathematical Sciences, Northern Illinois University DeKalb, 31 August 2009.

Approaches to stability characterizations for solution maps of perturbed inclusions, 20th International Symposium on Mathematical Programming, Chicago, Illinois, USA, 23-28 August 2009.

Calmness of infinite and semi-infinite constraint systems, 7th EUROPT Workshop *Advances in Continuous Optimization*, Remagen/Germany, 3-4 July 2009.

Taylor expansion for critical values and its application in optimization, Plenary Talk, 16th Conference on Mathematical Methods in Economics and Industry, Ceske Budejovice, 15-19 June 2009.

Nonsmooth Newton schemes for generalized semi-infinite programs, 4th German-Polish Conference on Optimization, Moritzburg, 14-18 March 2009.

Approaches to Semi-Infinite Optimization, Tutorial, Autumn School: Optimization and Multiphase Problems, Budapest, 6-10 October 2008.

Generalized semi-infinite programs: reduction approach and a nonsmooth Newton method, Sixth Joint OR Days, Lausanne, 11 September 2008.

Envelope theorems and generalized second-order derivatives of critical values, Operations Research 2008, Augsburg, 3-5 September 2008.

Nonsmooth Newton methods: Convergence, solution schemes and application to semi-infinite optimization, One Day Optimization Workshop, Department of Mathematics, Politecnico di Milano, 19 May 2008.

Characterizations for calmness of multifunctions and the approach via optimization methods, 11th Workshop on Well-Posedness in Optimization and Related Topics, Alicante, Spain, 10-14 September 2007.

Optimization methods and Lipschitz stability of inclusions in Banach spaces, EURO XXII – Prague, 8-11 July 2007.

Lipschitz Stability of Solutions to Generalized Equations and Optimization Problems, Arbeitsgemeinschaft Analysis, Universität Zürich, 14.6.2007.

Konzepte der Stabilität von Lösungen nichtlinearer Optimierungsprobleme und ihre Charakterisierung, Mathematisches Kolloquium, Universität Würzburg, 02.02.2007.

Strong Lipschitz stability of solutions to perturbed convex semi-infinite programs, Fourth OR Days, Lausanne, 14-15 September 2006.

Criteria for Lipschitz stability of optimal solutions to convex programs, Operations Research 2006, Karlsruhe 6.-8. September 2006.

Characterizations of Lipschitz stability of solutions to nonlinear optimization problems, Mathematisches Kolloquium, Universität Trier, 13.07.2006.

Lipschitz stability for stationary solutions of nonlinear optimization problems, Seminar der Forschungsgruppe Nichtlineare Optimierung und Inverse Probleme, WIAS Berlin, 03.01.2006.

Parametric quadratic optimization revisited, Invited Plenary Talk, International Conference on Parametric Optimization and Related Topics (PARAOPT VIII) November 27 - December 1, 2005, Cairo (Egypt).

Lipschitz stability in nonlinear optimization, Talk at the University of Alicante, 10 October 2005.

Newton methods for nonsmooth equations in optimization – an elementary view, Talk at the Miguel Hernández University Elche, 9 October 2005.

Stability for nonlinear programs under linear constraints, 10th Workshop on Well-Posedness of Optimization Problems and Related Topics, Borovets, Bulgaria, September 5-9, 2005.

Nonsmooth equations in optimization: Regularity and generalized Newton schemes, Third OR Days, IBM Rüschlikon, Switzerland, 15-16 September 2005.

Stability of stationary solutions for nonlinear programs and variational conditions with linear constraints, 22nd IFIP TC7 Conference on System Modelling and Optimization, Turin, 18-22 July 2005.

Stability in nonlinear optimization under constraint degeneracy. Optimization and Applications, Oberwolfach Meeting, 9-15 January 2005.

Convergence of primal-dual solutions for the log-barrier method and Lipschitz stability for nonlinear programs without LICQ. 12th French-German-Spanish Conference on Optimization, Avignon, 20-24 September 2004.

Lipschitz estimates for primal-dual solutions of log-barrier type methods in the absence of LICQ. Second Joint Operations Research Days, Université de Genève, Chateau de Coppet, 8-10 September 2004.

Characterizations of Lipschitz properties for stationary solutions of perturbed nonlinear programs under MFCQ. GAMM 75th Annual Meeting, TU Dresden, 21-27 March 2004.

Lipschitz-Analysis von stationären Lösungen parametrischer nichtlinearer Optimierungsprobleme. Festkolloquium aus Anlass des 65. Geburtstags von Prof. Dr. K. Beer, TU Chemnitz, 23 January 2004.

Characterizations of Lipschitz Stability for Stationary Solutions of Nonlinear Programs under MFCQ. IX Workshop on Well-Posedness in Optimization, CIRM, Marseille-Luminy, France, 8.-12.09.03.

Strong Lipschitz Stability of Stationary Solutions in Variational Analysis under MFCQ, Part II: Application to Nonlinear Optimization. 18th ISMP Copenhagen, Denmark, 18.-22.08.03.

Charakterisierungen der Lipschitz-Stabilität von Lösungen nichtlinearer Optimierungsprobleme. Vortrag am Lehrstuhl Numerik/Optimierung der Technischen Universität Berlin, 26.06.03.

Regularitätskonzepte für nichtglatte Gleichungen und ihre Anwendung in der nichtlinearen Optimierung. Vortrag im Dresdner Mathematischen Seminar, TU Dresden, 25.06.03.

Regularitätskonzepte für nichtglatte Gleichungen und ihre Anwendung auf Optimierungs- und Gleichgewichtsprobleme. Oberseminar Optimierung, Max Planck Institute for Mathematics in the Sciences, Universität Leipzig, D, 28.11.02.

Constrained minima and Lipschitzian penalties. French-German-Polish Conference on Optimization, Cottbus, D, 9.-13.9.02. (co-author B. Kummer, Berlin).

Second order optimality conditions for $C^{1,1}$ programs and their application to solution stability. Operations Research 2002 - International Conference on Operations Research, Klagenfurt, A, 2.-5.9.02.

Existenz und Anwendung von Lipschitz-Fehlerschranken für Lösungen gestörter nichtlinearer Optimierungsprobleme. Colloquium Operations Research, Universität Karlsruhe, D, 27.6.02.

Lipschitz properties of multifunctions and their application to optimization problems. Series of talks at the Miguel Hernández University Elche, Elche, Spain, 4.-8.3.02.

Lipschitz stability in nonlinear optimization via generalized derivatives. Mathematical colloquium, Miguel Hernández University Elche, Elche, Spain, 7.3.02.

Extension of the existence theorem of linear optimization to optimization problems involving convex polynomials. Mathematical colloquium, University of Alicante, Alicante, Spain, 6.3.02.

Lipschitz stability of stationary and optimal solutions of parameterized nonlinear programs. Workshop on Well-Posedness in Optimization and Related Topics, Banach Center, Warsaw, PL, 10.-14.09.01.

Quadratic approximations of nonlinear programs and perturbations analysis of stationary solutions. 20th IFIP TC 7 Conference on System Modelling and Optimization, Trier, D, 23.-27.07.01.

Optimalitäts- und Lipschitz-Stabilitätsbedingungen 2. Ordnung in der nichtlinearen Optimierung. Forschungsseminar "Optimierung" an der Humboldt-Universität zu Berlin, Berlin, D, 19.07.01.

Nichtglatte Gleichungen in der Optimierung: Regularität und Newton-Verfahren. Mathematisches Kolloquium der TU Ilmenau, Ilmenau, D, 12.01.01.

Second-order conditions for upper regularity of solutions to nonlinear programs. French-German-Italian Conference on Optimization, Montpellier, France, 4.-8.9.2000.

Existence and stability theorems for optimization problems involving convex polynomials. Mathematical colloquium, Old Dominion University, Norfolk, Virginia, USA, 14.8.2000.

Regularity of KKT systems and Taylor expansion of the marginal map in nonlinear optimization. 17th International Symposium on Mathematical Programming, Atlanta, Georgia, USA, 7.-11.8.2000.

Supported research projects (selected)

Swiss National Foundation Project 200021-116048/1 *Generalized Newton-type methods for nonsmooth equations in optimization and complementarity problems*, 04/07-03/08; leader.

Cooperation in Science and Research with CEEC/NIS, Institutional Partnerships: *Global and stochastic optimization* (project coordinator: P. Kall), 1996-98, SNSF Project No. 7 IP 050104; co-worker.

DFG-project *Regularity notions of nonsmooth (generalized) equations and their application* (leader: B. Kummer, Berlin), 1997-98, supported by the Deutsche Forschungsgemeinschaft; co-worker.

DFG-project *Numerical Analysis of Nonlinear Parametric Optimization and Control Problems*, 1991-92, supported by the Deutsche Forschungsgemeinschaft; co-leader.

IIASA contracted study *The Development of Parametric Optimization and its Applications*, 1987-88, supported by the International Institute of Applied Systems Analysis, Laxenburg/Austria; co-leader.

Industrial project *Optimal Planning in Road Reconstruction*, 1988-1990, supported by the Ministry of Transport of GDR; leader.

Research seminars

Optimization and Applications Seminar (UNI/ETH ZH, each semester 2005-2015, co-organizer).

Arbeitsgemeinschaft Analysis (UNI ZH), together with Michel Chipot (FS 14, SS 15) ¹.

Quantitative methods in economics (UNI/ETH ZH, each semester 1999-2005, co-organizer).

Teaching and supervising

Students

Doctoral thesis (Dr.rer.nat.) Gisbert Thiere, PH Halle, 1988; Doctoral thesis (Dr.sc.) Stephan Bütikofer, ETH Zürich, 2008; Doctoral thesis (Dr.sc.) Anna-Laura Haber Wickström, Universität Zürich, 2014; Doctoral study in economics (Dr.oec.) Eleftherios Couzoudis, Universität Zürich, 2016; more than 25 diploma, master and bachelor theses (Humboldt University Berlin, PH Halle, University of Zurich).

¹FS Fall/Winter Semester, SS Spring/Sommer Semester

Graduate seminars

Advanced seminar in OR (FS 92/93, each FS 94/95-97/98, co-organizer).
Basic seminar in OR (SS 96, SS 97).

Graduate courses

Optimization Methods (2011-2015 each SS).
Optimization: Nonlinear Models (SS 08).
Optimization: Linear Models (SS 07).
Parametric optimization and applications (SS 03, FS 05/06, FS 07).
Integer programming (FS 94/95, FS 06/07).
Quadratic optimization and approximation (FS 01/02).
Complementarity problems: theory and methods (FS 00/01).
Parametric optimization and sensitivity analysis (SS 93, SS 97, FS 99/00).
Nonlinear programming (SS 94, SS 95, SS 99).
Linear programming (FS 93/94, FS 98/99).
Stochastic methods of Operations Research (SS 98).
Optimization and equilibria (SS 98).
Methods of nonsmooth analysis (SS 96).
Optimization theory and methods (each semester 85-91).
Convex analysis (FS 85/86, SS 86, FS 86/87, SS 87).
Parametric Optimization (FS 79/80)

Undergraduate courses

Mathematics for economists (1994-2015, each semester).
Mathematics III for economists (2012-2015 each FS)
Introduction to mathematical methods of OR (2012-2015 each SS)
Analysis for economists (2004-2011 each SS).
Linear algebra for economists (2003-2011 each FS).
Operations Research (FS 95/96, FS 96/97, FS 97/98, FS 02/03).
Basics in optimization (SS 00, SS 01, SS 02).
Linear algebra (FS 85/86, FS 87/88, FS 90/91, FS 91/92).
Analysis 2 (FS 88/89).

Supported teaching projects

E-Learning Project *Interaktives Lernen im Mathematik-Grundkurs*, Faculty of Economics, University of Zurich 01/11-12/15; leader.

E-Learning Project *Elektronische Ergänzungsübungen Mathematik für Wirtschaftswissenschaftler*, Faculty of Economics, University of Zurich 01-12/10; leader.