

Werner Römisch

Curriculum Vitae

1. Business Address:

Humboldt-University Berlin
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2. Academic Degrees

- 1971 Diploma in Mathematics, Humboldt-University Berlin
- 1976 Dissertation (Dr. rer. nat.) in Mathematics, Humboldt-University Berlin
- 1984 Habilitation (Dr. sc. nat.) in Mathematics, Humboldt-University Berlin

3. Professional Experience

- 1971 - 1972 Graduate Student, Humboldt-University Berlin
- 1972 - 1984 Scientific Assistant, Humboldt-University Berlin
- 1984 - 1993 University Dozent (Associate Professor), Department of Mathematics, Humboldt-University Berlin
- 1993 - Professor, Institute of Mathematics, Humboldt-University Berlin

4. Research Experience and Interests

Applied Mathematics; Operations Research; Applied Optimization; Stochastic Optimization; Stochastic Analysis; Numerical Analysis; Optimal Control.

5. Research Grants

- 1978 - 1981 Industrial project *Optimization of polymerization processes* supported by the chemical company Buna at Schkopau.
- 1986 - 1990 Industrial project *Optimization of power systems* supported by the East German electricity company.
- 1988 Cooperation project *Parametric Optimization* of the Humboldt-University Berlin and of the International Institute of Applied Systems Analysis (IIASA), Laxenburg (Austria).
- 1992 - 1996 Research project *Approximation and stability in stochastic programming*, supported by the German Research Foundation (DFG).
- 1993 - 1997 Research project *Unit commitment in power production planning* with the electricity company VEAG at Berlin and supported by the German Ministry of Education and Research (BMBF).

- 1995 - 2001** Research project *Online power scheduling under incomplete information* supported by the Priority Program *Online optimization of large systems* of the DFG.
- 2000 - 2001** Research project *Airline revenue management* supported by the company Lufthansa Systems.
- 2000 - 2003** Research project *Simulation elektrischer Netzwerke mit Rausch-effekten mittels stochastischer Algebra-Differentialgleichungen* with the company Infineon Technologies and supported by the BMBF.
- 2000 - 2003** Research project *Stochastische Optimierungsmethoden für die simultane Kraftwerkseinsatz- und Handelsplanung im liberalisierten Strommarkt* with the company E.ON and supported by the BMBF.
- 2002** Industrial project *Scenario reduction for stochastic programming models* supported by the company GAMS Software.
- 2002 - 2004** Research projekt *Mittelfristige risikoorientierte Optimierung von Strombeschaffungs-Portfolios kleinerer Marktteilnehmer* with the company Drewag Dresden and supported by the BMBF.
- 2002 - 2006** Research project *Origin destination control in airline revenue management by dynamic stochastic programming* supported by the DFG Research Center MATHEON Berlin.
- 2002 - 2006** Research project *Mean-risk models for electricity portfolio management and stochastic programming* supported by the DFG Research Center MATHEON Berlin.
- 2003 - 2004** Industrial project *Scenario trees and risk* supported by the company Electricité de France.
- 2003 - 2006** Research project *Numerical methods for stochastic differential-algebraic equations applied to transient noise analysis in circuit simulation* supported by the DFG Research Center MATHEON Berlin.
- 2004 - 2007** Research project *Effiziente transiente Rauschanalyse in der Schaltungssimulation* with the company Infineon Technologies and supported by the BMBF.
- 2005 - 2008** Research project *Dezentrale regenerative Energieversorgung: Innovative Modellierung und Optimierung: Dekomposition und Approximation in blockstrukturierten gemischt-ganzzahligen Optimierungsaufgaben* supported by BMBF.
- 2005 - 2007** Research project *Simulation based Stochastic Optimisation Methods for Risk Management in Liberalized Energy Markets (SIMOPT/ENERGY)* supported by Wiener Wissenschafts-, Forschungs- und Technologiefonds.
- 2006 - 2010** Research project *Mean-risk optimization of electricity production in liberalized markets* supported by the DFG Research Center MATHEON Berlin.

6. Organization of Conferences

- March 1992** Chairman of the GAMM/IFIP-Workshop *Stochastic Programming: Stability, Numerical Methods and Applications* at Gosen near Berlin, supported by the Volkswagen-Stiftung and the Society of Applied Mathematics and Mechanics (GAMM).
- January 1994** Chairman of the Minisymposium *Stochastic Programming* at the Humboldt-University Berlin, supported by the German Research Foundation (DFG).
- August 1998** Member of the Organizing Committee of the *International Congress of Mathematicians* (ICM'98) at Berlin.
- August 2001** Co-Chairman of *Ninth International Conference on Stochastic Programming* at Berlin, supported by the German Research Foundation (DFG).

7. Services to the Scientific Community

- Co-Editor of the *Stochastic Programming E-Print Series* since 1999 (<http://www.speps.org>).
- Associate Editor *Optimization Letters* (Springer) since 2006.
- Co-Editor of special issues of *Journal of Computational and Applied Mathematics* 56 (1-2) (1994) (with S.T. Rachev) and *Annals of Operations Research* 142 (2006) (with R. Schultz).
- Member of the Working Group 7.7 on Stochastic Optimization des IFIP TC 7 since 1988.
- Member of Program Committees of the *International Conferences on Stochastic Programming* at Ann Arbor (1989), Udine (1992), Vancouver (1998), Tucson (2004) and of several other conferences.
- Co-Director of the ERASMUS-Project ICP-96-I-0150 for students exchange during 1991-1997 (Universities: Univ. Milano, Univ. Pisa, Univ. Nancy I, Univ. Paris-Sud (XI), Univ. Köln, Humboldt-Univ. Berlin, ETH Zürich).
- Member of the Graduate Schools *Geometry and Nonlinear Analysis* (1992-2001) and *Stochastic Modelling and Quantitative Analysis of Complex Systems in Engineering* (since 1999).
- Co-Director of the Project Group *Stochastic Optimization and Applied Probability Theory* of the Humboldt-University Berlin at the Konrad-Zuse-Zentrum für Informationstechnik Berlin (ZIB) directed by M. Grötschel and supported by the local government of Berlin, 1992–1996.
- Co-Initiator of the Priority Program *Online Optimization of Large Systems* of the German Research Foundation (DFG) in 1994.
- Opponent or referee in dissertation committees at the University of Groningen (1995), Royal Institute of Technology at Stockholm (1997), Norwegian Institute of Technology at Trondheim (2000), Charles University Prague (2005), University Lund (2005).

Co-Organizer of the Section *Optimization and Discrete Mathematics* at the Annual Meeting of the DMV 1996 (Jena), of Minisymposia at ICIAM 95 (Hamburg) and Annual Meeting of GAMM 2004 (Dresden), of a Workshop *Optimierung in der Kraftwerkstechnik* at the Congress *Mathematics in Industry* at Duisburg 1997 and of several Sessions at other conferences.

Member of the DFG Research Center Berlin *Mathematics of Key Technologies* since June 2002.

Referee of several scientific societies (e.g., USA, Germany, Sweden, Austria, Switzerland, Czech Republic, Minerva).

Referee of scientific publications, e.g., Springer, SIAM Journal on Optimization, Mathematical Programming, Mathematics of Operations Research, Annals of Operations Research, Transactions of Operations Research, Operations Research, European Journal of Operations Research, Numerische Mathematik, Optimization, Journal of Optimizations Theory and Applications, Optimization and Engineering, Computational Optimization and Applications, Probability Theory and Related Fields, Stochastics, Numerical Functional Analysis and Optimization, Journal of Computational and Applied Mathematics, Mathematische Nachrichten and several Proceedings Volumes.

Reviewer for Mathematical Reviews during 1983-1991.

Member of Mathematical Programming Society, German Mathematical Society (DMV), Society of Applied Mathematics and Mechanics (GAMM), Society of Operations Research (GOR).

8. Teaching Experience: Lectures

- Numerical Analysis (1983/84; 1995);
- Analysis and Numerical Analysis (for Computer Science students) (1984-86, 1990-92, 1992-94);
- Numerical Methods for Ordinary Differential Equations (1977, 1987, 2006/07);
- Stochastic Operator Equations and Their Approximation (1979, 1981);
- Numerical Solution of Partial Differential Equations (instationary problems) (Univ. Linz, Part I: 1982, Part II: 1983);
- Probability Measures on Metric Spaces - Application to Stochastic Equations (1985-1987);
- Discretization of Operator Equations (1987/88);
- Stochastic Programming (1989-1991, 1995, 1997/98, 2000, 02/03, 06/07);
- Regularity and optimality conditions in optimal control (Univ. Havana, Sept. 1989);
- Numerical Methods for Integral Equations (1992);
- Numerical Approximation (1994/95; 1995/96; 1998/99);
- Set-Valued Analysis (1995/96);

- Splines and Wavelets (1996/97);
- Scientific Computing II (9 times during 1998-2006);
- Wavelets (1998, 2003/04);
- Mathematics (for Biophysics students) (1999-2001, 01-03, 03/04, 05/06).

Habilitations:

Rüdiger Schultz (1994), René Henrion (1998), Ivo Nowak (2004).

Supervision of Dissertations:

Matthias Gelbrich (graduated in 1990), Marta Lourdes Baguer (1990), Lulia E. Cuesta (1991), Nicole Gröwe (1995), Matthias Nowak (2000), Appolinaire Nzali (2001). Presently under supervision: Andreas Eichhorn, Holger Heitsch, Stefan Vigerske, Christian Kuchler, Thorsten Sickenberger.

Supervision of Diplomas: 15 students.

9. Publications

- [1] R. SCHULZE, W. RÖMISCH: Kennwertmethoden für nichtlineare Volterrasche Integralgleichungen in stetigen stochastischen Prozessen, VII. Int. Konf. *Nichtlineare Schwingungen*, Berlin 1975, Bd. I/2, Abh. Akad. Wiss. DDR (1977) 4, 245-251.
- [2] W. RÖMISCH, R. SCHULZE: Ein Verfahren zur numerischen Simulation stochastischer Prozesse, Berichte der Tagung *Stochastische Schwingungen und Zuverlässigkeit* Eisenach 1976, ZIMM der AdW der DDR, Berlin (1977) 1, 25-31.
- [3] R. SCHULZE, W. RÖMISCH: Numerische Methoden für stochastische Differentialgleichungen, Berichte der Tagung *Stochastische Schwingungen und Zuverlässigkeit* Eisenach 1976, ZIMM der AdW der DDR, Berlin (1977) 1, 32-42.
- [4] W. RÖMISCH, R. SCHULZE: Ein Verfahren zur Simulation stochastischer Prozesse. Anwendung auf spezielle Prozeßklassen, VIII. Internationaler Kongreß für Anwendungen der Mathematik, Weimar 1978, Berichte Bd. 2, 266-272.
- [5] W. RÖMISCH, R. SCHULZE: Kennwertmethoden für stochastische Volterrasche Integralgleichungen, *Wiss. Zeitschr. Humboldt-Univ. Berlin, Math.-Nat. R.* 28 (1979), 523-533.
- [6] K. BUCHALI, H.B. ZIMMERMANN, W.R. DIETERICH, D. STRANGFELD, W. RÖMISCH, A. BOCK, H.J. CORRENS: Bestimmung der Leberdurchblutung nach Inhalation von 133 Xenon, *Radiobiol.-Radiother.* 20 (1979), 301-304.
- [7] W. RÖMISCH: Zur numerischen Behandlung eines Problems der optimalen Steuerung von Polymerisationsprozessen, in: *Numerische Behandlung mathematischer Modellgleichungen*, ZIMM der AdW der DDR, Report R-09/80, Berlin 1980, 86-91.

- [8] W. RÖMISCH: An approximation method in stochastic optimal control, in: Optimization Techniques, Part 1, Lecture Notes in Control and Information Sciences Vol. 22, Springer-Verlag, Berlin, 1980, 169-178.
- [9] W. RÖMISCH: On the approximate solution of random operator equations, Wiss. Zeitschr. Humboldt-Univ. Berlin, Math.-Nat. R. 30 (1981), 455-462.
- [10] W. RÖMISCH: Remarks on the numerical treatment of optimal control problems, IX. Internationaler Kongreß für Anwendungen der Mathematik, Weimar 1981, Berichte Bd. 2, 82-86.
- [11] W. RÖMISCH: On discrete approximations in stochastic programming, in: Proceedings 13. Jahrestagung *Mathematische Optimierung*, Vitte 1981 (K. Lommatzsch Ed.), Humboldt-Univ. Berlin, Sect. Math., Seminarbericht Nr. 39 (1981), 166-175.
- [12] A. ISA, W. RÖMISCH: Zur numerischen Behandlung der Optimierung eines Polymerisationsprozesses, in: 4. Fachtagung *Numerische Realisierung mathematischer Modelle*, Zingst 1981, Vortragsauszüge, ZfR-Informationen 81.16, ZfR der AdW der DDR, 1981, 71-84.
- [13] H.W. ENGL, W. RÖMISCH: Convergence of approximate solutions of non-linear random operator equations with non-unique solutions, Stochastic Analysis and Applications 1 (1983), 239-298.
- [14] W. RÖMISCH: On an approximate method for random differential equations, in: Problems of Stochastic Analysis in Applications (J. vom Scheidt Ed.), Wiss. Beiträge der Ingenieurhochschule Zwickau, Sonderheft 1983, 327-337.
- [15] W. RÖMISCH: An approximation method in stochastic optimization and control, in: Mathematical Control Theory, Banach Center Publications Vol. 14, PWN, Warsaw 1985, 477-490.
- [16] H.W. ENGL, W. RÖMISCH: Approximate solutions of nonlinear random operator equations: Convergence in distribution, Pacific Journal of Mathematics 120 (1985), 55-77.
- [17] A.T. BHARUCHA-REID, W. RÖMISCH: Projective schemes for random operator equations: Weak compactness of approximate solution measures, Journal of Integral Equations 8 (1985), 95-111.
- [18] W. RÖMISCH, A. WAKOLBINGER: On Lipschitz dependence in systems with differentiated inputs, Mathematische Annalen 272 (1985), 237-248.
- [19] W. RÖMISCH: Convergence of measurable selections and measurable solutions in stochastic optimization, in: Mathematical Methods in Operations Research (P. Kenderov Ed.), Sofia 1985, 80-87.
- [20] W. RÖMISCH: On the convergence of measurable selections and an application to approximations in stochastic optimization, Zeitschrift für Analysis und Anwendungen 5 (1986), 277-288.
- [21] W. RÖMISCH: On weak convergence of approximate solutions of random operator equations, in: Proceedings 2. Tagung *Stochastische Analysis*, (J.

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- [22] W. RÖMISCH: On convergence rates of approximations in stochastic programming, in: Proceedings 17. Jahrestagung *Mathematische Optimierung* (K. Lommatzsch Ed.), Humboldt-Universität Berlin, Sektion Mathematik, Seminarbericht Nr. 80 (1986), 82-91.
- [23] H.W. ENGL, W. RÖMISCH: Weak convergence of approximate solutions of stochastic equations with applications to random differential and integral equations, *Numerical Functional Analysis and Optimization* 9 (1987), 61-104.
- [24] W. RÖMISCH, A. WAKOLBINGER: Obtaining convergence rates for approximations in stochastic programming, in: *Parametric Optimization and Related Topics* (J. Guddat et al. Eds.), Akademie-Verlag, Berlin 1987, 327-343.
- [25] W. RÖMISCH, A. WAKOLBINGER: On convergence rates of approximate solutions of stochastic equations, in: *Stochastic Differential Systems, Lecture Notes in Control and Information Sciences Vol. 96*, Springer-Verlag, Berlin 1987, 204-212.
- [26] W. RÖMISCH, R. SCHULTZ: On distribution sensitivity in chance constrained programming, in: *Advances in Mathematical Optimization* (J. Guddat et al. Eds.), Akademie-Verlag, Berlin 1988, 161-168.
- [27] W. RÖMISCH, R. SCHULTZ: Distribution sensitivity for a chance constrained model of optimal load dispatch, in: R. Vichnevetsky, P. Borne, J. Vignes (Eds.), *Proceedings of 12th IMACS World Congress of Scientific Computation, Vol. 2*, Paris 1988, 42-44.
- [28] W. RÖMISCH, R. SCHULTZ: Stability of solutions for stochastic programs with complete recourse having $C^{1,1}$ data, Manuskript, Institut für Operations Research der Universität Zürich, 1989.
- [29] W. RÖMISCH, R. SCHULTZ: Stochastic programs with complete recourse: Stability and an application to power dispatch, in: *System Modelling and Optimization* (H.-J. Sebastian, K. Tammer Eds.), *Lecture Notes in Control and Information Sciences Vol. 143*, Springer-Verlag, Berlin 1990, 688-696.
- [30] W. RÖMISCH, R. SCHULTZ: Distribution sensitivity in stochastic programming, *Mathematical Programming* 50 (1991), 197-226.
- [31] W. RÖMISCH, R. SCHULTZ: Stability analysis for stochastic programs, *Annals of Operations Research* 30 (1991), 241-266.
- [32] W. RÖMISCH, R. SCHULTZ: Distribution sensitivity for certain classes of chance constrained models - with application to power dispatch, *Journal Optimization Theory and Applications* 71 (1991), 569-588.
- [33] N. GRÖWE, W. RÖMISCH: A stochastic programming model for optimal power dispatch: Stability and numerical treatment, in: *Stochastic Optimization* (K. Marti Ed.), *Lecture Notes in Economics and Mathematical Systems Vol. 379*, Springer-Verlag, Berlin, 1992, 111-139.

- [34] O. FIEDLER, W. RÖMISCH: Weak convergence of approximate solutions of random equations, *Numerical Functional Analysis and Optimization* 13 (1992), 495-511.
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- [40] A. MÖLLER, W. RÖMISCH: A dual method for the unit commitment problem; Humboldt-Universität Berlin, Institut für Mathematik, Preprint Nr. 95-1, 1995.
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- [42] D. DENTCHEVA, W. RÖMISCH, R. SCHULTZ: Strong convexity and directional derivatives of marginal values in two-stage stochastic programming, in: *Stochastic Programming: Numerical Techniques and Engineering Applications* (K. Marti, P. Kall Eds.), *Lecture Notes in Economics and Mathematical Systems* Vol. 423, Springer-Verlag, Berlin 1995, 8-21.
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- [44] N. GRÖWE, W. RÖMISCH, R. SCHULTZ: A simple recourse model for power dispatch under uncertain demand, *Annals of Operations Research* 59 (1995), 135-164.
- [45] W. RÖMISCH, R. SCHULTZ: Lipschitz stability for stochastic programs with complete recourse, *SIAM Journal on Optimization* 6 (1996), 531-547.
- [46] W. RÖMISCH, R. SCHULTZ: Decomposition of a multi-stage stochastic program for power dispatch, *ZAMM - Zeitschrift für Angewandte Mathematik und Mechanik* 76 (1996) Suppl.3, 29-32.
- [47] W. RÖMISCH, R. SCHULTZ, D. DENTCHEVA, R. GOLLMER, A. MÖLLER, P. REEH, G. SCHWARZBACH, J. THOMAS: Optimale Blockauswahl bei der Kraftwerkseinsatzplanung, in: *Mathematik - Schlüsseltechnologie für*

- die Zukunft (K.-H. Hoffmann, W. Jäger, T. Lohmann, H. Schunck Eds.), Springer-Verlag, Berlin 1997, 567-577.
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- [50] R. GOLLMER, A. MÖLLER, W. RÖMISCH, R. SCHULTZ, G. SCHWARZBACH, J. THOMAS: Optimale Blockauswahl bei der Kraftwerkseinsatzplanung der VEAG, in: Optimierung in der Energieversorgung II, VDI-Berichte 1352, Düsseldorf 1997, 71-85.
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- [55] H. ARELLANO GARCIA, R. HENRION, P. LI, A. MÖLLER, W. RÖMISCH, M. WENDT, G. WOZNY: A model for the online optimization of integrated distillation columns under stochastic constraints, DFG-Schwerpunktprogramm *Echtzeit-Optimierung grosser Systeme*, Preprint 98-32, 1998.
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- [57] N. GRÖWE-KUSKA, M.P. NOWAK, W. RÖMISCH, I. WEGNER: Optimierung eines hydro-thermischen Kraftwerkssystems unter Ungewißheit, in: Optimierung in der Energieversorgung. Planungsaufgaben in liberalisierten Energiemärkten, VDI-Berichte 1508, Düsseldorf 1999, 147-157.

- [58] R. HENRION, W. RÖMISCH: Stability of solutions to chance constrained stochastic programs, in: Parametric Optimization and Related Topics V (J. Guddat, R. Hirabayashi, H.Th. Jongen and F. Twilt eds.), Peter Lang, Frankfurt a.M. 2000, 95-114.
- [59] N. GRÖWE-KUSKA, K.C. KIWIEL, M.P. NOWAK, W. RÖMISCH, I. WEGNER: Power management under uncertainty by Lagrangian relaxation, in: Proceedings of the 6th International Conference Probabilistic Methods Applied to Power Systems PMAPS 2000, Volume 2, INESC Porto, 2000.
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- [61] D. DENTCHEVA, W. RÖMISCH: Differential stability of two-stage stochastic programs, SIAM Journal on Optimization 11 (2000), 87-112.
- [62] M.P. NOWAK, W. RÖMISCH: Stochastic Lagrangian relaxation applied to power scheduling in a hydro-thermal system under uncertainty, Annals of Operations Research 100 (2000), 251-272.
- [63] W. RÖMISCH, R. SCHULTZ: Multistage stochastic integer programs: An introduction, in: Online Optimization of Large Scale Systems (M. Grötschel, S.O. Krumke, J. Rambau eds.), Springer-Verlag, Berlin 2001, 579-598.
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- uncertainty, in: Mathematics – Key Technology for the Future (W. Jäger, H.-J. Krebs eds.), Springer 2003, 623-636.
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