

# Curriculum Vitae, Georg Still

- Date and place of birth: November 13, 1951, Mülheim, Germany.
- Study: From 1973-1979 at the Universities of Saarbrücken and Siegen.

## Academic Titles:

**Doctorate**, at the University of Mannheim (Germany), 1983: *Über die Approximation von Müntz-Summen durch Müntz-Polynome*”

**Habilitation** (Priv. Dozent), University of Trier (Germany) 1990: *“Defektminimierungsmethoden zur Lösung Elliptischer Eigenwertaufgaben.”*

## Research activities:

Optimization, semi-infinite optimization, parametric optimization, approximation theory, applications in partial differential equations, traffic models.

## Teaching Activities:

Lectures in Optimization, Semi-infinite Optimization, Numerical Analysis, Approximation Theory and different basis courses in Analysis and Linear Algebra.

**PhD-projects:** (applications, supervision, organization)

## **I. External Project-applications:**

### **successful:**

1. International project, “Semi-infinite Optimization”, with Prof. B. Karasozen, Prof. G. Weber (METU, Ankara), Oliver Stein (University of Karlsruhe), 2004-2008 by TUBITAK (Turkish National Sciences Council) with 3 PhD-positions for 4 years (at METU).
2. IOP-project, “Smart synthesis tools (SST)”, (2006-2011) together with H. Tragter (CTW-TU), T. Tomyama (TU Delft).  
4 PhD-positions, in particular, Matthijs Bomhoff, with PhD-project *“Constraint solving in smart synthesis tools”* at EWI.

**unsuccessful:** • NWO (VIDI, 2004), • NWO (Open competitie, 2006), • IOP-aanvraag (opvolgproject SST, 2009).

### **current applications:**

1. NWO (open competitie 2009, two AIO’s) (Conic programs and semi-definite optimization: interactions and complexity issues, with M. Duer, RUG)
2. STW (2009, in preparation, 1 AIO) (Bilevel optimization in multiobjective road pricing: a cooperative approach, together with W. Kern)  
As a precursor of this project, a SOR-project (CTIT) on “Road pricing” is planned together with W. Kern and Erik van Berkum (CIT). (A preliminary acceptance has been given for this project)

## **II. supervision of PhD-students**

- Petrica Pop, *The generalized minimum spanning tree problem*, University of Twente, 2002.
- Ligong Wang, *Integral trees and integral graphs*, University of Twente, 2005.
- Gemaygzal Bouza, *Parametric optimization techniques for solving mathematical programs with equilibrium constraints*, University of Twente, 2006.
- *Currently:*  
M. Bomhoff (IOP-project)  
Hongrui Zhang (joint Chinese-DWMP project)  
Faizan Ahmad (5 year MSc/PhD scholarship)  
planned: Anthony Ohazulike (SOR-project together with W. Kern and Erik van Berkum (CIT), see above.

### **III. Work in the organization of International joint PhD-projects at DWMP:**

#### **PhD-projects finished**

- H. Zhao (dissertation, University of Twente, 2005)
- L. Wang (dissertation, University of Twente, 2005), (Still: Co-Promotor)
- G. Bouza (dissertation, University of Twente, 2006), (Still: Co-Promotor)
- G. Xu (dissertation, University of Twente, 2008)
- J. Wu (dissertation, University of Twente, 2009)

#### **Current projects** 5 PhD-projects and 3 MSc/PhD projects

- Dongshuang Hou (Chinese scholarship, 2009-2013)
- Hongrui Zhang (joint China/DWMP project, 2009-2012)  
supervisor: H. Broersma, X. Li, G. Still
- Min Xia (joint China/DWMP project, 2009-2012)  
supervisor: H. Broersma, X. Li, T. Driessen
- Xiaoyan Zhang (joint China/DWMP project, 2010-2013)  
supervisor: H. Broersma, X. Li, M. Uetz
- Deqin Chen (joint China/DWMP project, 2010-2013)  
supervisor: H. Broersma, X. Li, G. Still
- Yuan Feng (5 year MSc/PhD scholarship, 2008-2013) supervisor: T. Driessen, M. Uetz
- Xian Qiu (5 year MSc/PhD scholarship, 2008-2013) supervisor: W. Kern
- Faizan Ahmad (5 year MSc/PhD scholarship, 2008-2013) supervisor: G. Still

#### **Organization of International Conferences:**

“Parametric Optimization and Related TopicsIV”, Enschede, June 6-9, 1995.

“Smooth and Nonsmooth Optimization; Theory and Application”, Rotterdam, July 12-13, 2001.

EUROPT conference on *Advances in Continuous Optimization*, Reykjavik, June 20-30, 2006

**Member of the Program Committee** of several International conferences

**Plenary talks and Invited Tutorials:**

1. Plenary lecture at the '3rd International Conference on Applied Mathematics (Oct. 2002, Baia Mare, Romania)': "*Optimization problems with infinitely many constraints*"
2. Tutorial at the 'International conference PARAOPT VII, March 2002, Puebla, Mexico': "*Approximation and Optimization: Classical results and new developments*".
3. Several tutorials on "*Semi-infinite optimization*" at "The EURO Summer Institute - ESI XXII, on Optimization and Data Mining, Ankara (July 9-25)", 2004.
4. Plenary lecture on 'Semi-infinite programming and related topics' at *Congreso Latino-Iberoamericano de Investigacion de Operaciones y Sistemas* (CLAIO XII), October 2004, Havana.
5. Tutorial *On some topics in Semi-infinite Programming*, at the 3rd Summer School on Applied Mathematics, Cairo, October 26 to November 3, 2005

**International award/distinction:**

- Visitante Distinguido de la Ciudad Puebla (Mexico,2002)
- EUROPT-Fellow 2007 (Given by the EUROPT-society)

**Grant:** Fellowship NWO-NSC 2004

**Regular Cooperation with:**

Dr. Ilker Birbil, Sabanci University, Istanbul  
Dr. H. Frenk, University of Rotterdam  
Prof. J. Guddat, Humbold University, Berlin  
Prof. W. Weber, University of Ankara (METU)  
Prof. Lai-Jiu Lin, University of Changua (Taiwan)  
Prof. J. Rueckmann, University of Birmingham  
Prof. M. Lopez, University of Alicante  
Prof. O. Stein, University of Karlsruhe

## List of publications

### 1983-1990:

1. Still G., *On the approximation of Müntz series by Müntz polynomials*, “Approximation Theory IV”, eds. Chui et al., Academic Press, 697-702, (1983).
2. Still G., *On the approximation of Müntz series by Müntz polynomials*, J. Approx. Theory, Vol. 45, 26-54, (1985).
3. Still G., *On the approximation of holomorphic functions by Müntz polynomials on an interval away from the origin*, J. Approx. Theory, Vol. 45, 167-193, (1985).
4. Hettich R., Haaren E., Ries M., Still G., *Accurate numerical approximations of eigenfrequencies and eigenfunctions of elliptic membranes*, Z. Angew. Math. Mech. 67, 589-597, (1987).
5. Hettich R., Still G., *Local aspects of a method for solving membrane-eigenvalue problems by parametric semi-infinite programming*, in “Parametric Optimiz. and related Topics”, eds Guddat et al., Akad. Verlag Berlin, 183-195, (1987).
6. Hettich R., Still G., *Computation of eigenvalues and eigenfunctions of symmetric operators by defect-minimization*, in “Numerical Treatments of Eigenvalue problems”, eds. Albrecht et al., ISNM83 vol. 4, 124-129, (1987).
7. Still G., *Computable bounds for eigenvalues and eigenfunctions of elliptic differential operators*, Numer. Math. 54, 201-223, (1988).
8. Tichatschke R., Hettich R., Still G., *About certain classes of inexact linear programming problems and their connections to semi-infinite programs*, Wiss. Z. Pädagogische Hochschule “Liselotte Herrmann” Güstrow Math.-Natur.Fak. 26, no. 1, 5-19, (1988).
9. Hettich R., Still G., Tichatschke R., *Connections between generalized, inexact and semi-infinite linear programming*, Zeitschr. Oper. Res. 33, 367-383, (1989).

### 1991:

1. Hettich R., Still G., *Semi-infinite programming models in robotics*, in “Parametric Optimiz. and related Topics II”, eds. J. Guddat et al., Akademie Verlag Berlin, vol 62, 112-118, (1991).
2. Still G., Haaren-Retagne E., Hettich R., *A numerical comparison of two approaches to compute membrane eigenvalues by defect-minimization*, in “Intern. Series of Numer. Math.” vol 96, Birkhäuser Verlag, 209-224, (1991).

### 1992:

1. Still G., *On density and approximation properties of special solutions of the Helmholtz equation*, Z. Angew. Math. Mech. 72, 277-290, (1992).

### 1994:

1. Jonker P., Still G., Twilt F., *On the partition of real symmetric matrices according to the multiplicities of their eigenvalues*, Control and Cybernetics, vol. 23, 169- 181, (1994).

### 1995:

1. Still G., Mousa E. *Uniqueness results for some vector-valued approximation problems*, in “Approximation and Optimization”, eds. J. Guddat et al., Peter Lang, Frankfurt, 607-629, (1995)

2. R. Hettich, G. Still, *Second order optimality conditions for generalized semi-infinite programming problems*, Optimization Vol. 34, pp. 195-211, (1995).

**1996:**

1. Still G., Streng M., *Survey Paper: Optimality conditions in smooth nonlinear programming*, Journal of Optimization Theory and Applications, 90 (3), 483-516, (1996).

**1997:**

1. Still G., Streng M., *The Chebyshev hyperplane optimization problem*, Journal of Global Optimization, Vol.11 No.4, 361-376, (1997).
2. Still G. *Solving vector-valued approximation problems: Numerical and genericity aspects*, Proceedings of the 3rd International Conference on Approximation and Optimization (Puebla, 1995), (16pp. electronic), Benemerita Univ. Auton. Puebla, Puebla, (1997).

**1998:**

1. Jonker P., Pouw M.M.A., Still G., Twilt F., *On the partition of real skew-symmetric  $n \times n$ -matrices according to the multiplicities of their eigenvalues* in 'Charlemagne and his Heritage, 1200 Years of Civilization and Science in Europe, Volume 2: Mathematical Arts', Butzer, ed., Brepols Verlag, 439-454, (1998).

**1999:**

1. Still G., *Generalized semi-infinite programming: Theory, methods*, European Journal of Operational Research 119, 301-313, (1999)
2. Dutta D., Murty K., Still G., Wilharm J., *On the determination of the maximum turnable state of a part*, in 'Integration of Process Knowledge into Design Support Systems', Kals/van Houten (Eds.), Kluwer, 109-118, (1999).

**2000:**

1. Pop P., Kern W., Still G., *Polyhedral aspects and optimality of the generalized minimum spanning tree problem*. 2nd International Conference on Applied Mathematics (Baia Mare, 2000). Bul. Ştiinţ. Univ. Baia Mare Ser. B Fasc. Mat.-Inform. 16, no. 1, (2000).
2. Stein O., Still G., *On optimality conditions for generalized semi-infinite programming problems*, Journal of Optimization Theory and Applications, Vol. 104, 443-458, (2000).

**2001:**

1. Hettich R., Still G., *Semi-infinite programming: Second order optimality conditions*, in C.A. Floudas and P.M. Pardalos (eds.): Encyclopedia of Optimization, Kluwer Academic Publishers, volume 5, pages 117-121 (2001).
2. Still G., *Generalized semi-infinite programming: Numerical aspects*, Optimization 49, No. 3, 223-242, (2001).
3. Still G., *Discretization in semi-infinite programming: Rate of convergence*, Math. Program., Ser. A 91, 53-69, (2001).
4. Jonker P, Still G., Twilt F., *On parametric linear-quadratic optimization problems*, Annals of Oper. Research 101, 221-253, (2001)
5. Still G., *How to split the eigenvalues of a one-parameter family of matrices*, Optimization 49, No.4, 387-399, (2001).

## **2002:**

1. Still G., *Linear bilevel problems: Genericity results and an efficient method for computing local minima*, Math. Methods Oper. Res. 55, no. 3, 383–400, (2002).
2. Stein O., Still G., *On generalized semi-infinite optimization and bilevel optimization.*, Europ. J. of Operational Research 142, Issue 3, 444-462, (2002).

## **2003:**

1. Still G., *Optimization problems with infinitely many constraints*, Bul. Stiint. Univ. Baia Mare, Ser. B, Matematica-Informatica, Vol. XViii, Nr.2, 343-354, (2003).
2. Stein O., Still G., *Solving semi-infinite optimization problems with interior point techniques*. SIAM J. Control Optim. 42, no. 3, 769–788, (2003).
3. Still G., *Approximation theory methods for solving elliptic eigenvalue problems*, Z. Angew. Math. Mech. 83, No. 7, 468-478, (2003).

## **2004:**

1. Still G., *Solving generalized semi-infinite programs by reduction to simpler problems*, Optimization, Vol. 53, No. 1, 19-34, (2004).
2. Still G., *Approximation and Optimization: Classical results and new developments*, Proceedings of PARAOPT VII, in ‘Aportaciones Matematicas’, (eds. J. Guddat et al.), pp. 207-233, (2004).

## **2005:**

1. Pop, Petrica; Still, Georg, *A direct way to obtain strong duality results in linear semidefinite and linear semi-infinite programming*. Mathematica 47(70) (2005), no. 1, 105–112.
2. Kern W., Pop, Petrica; Still, Georg, *Approximation Theory in Combinatorial Optimization. Application to the generalized minimum spanning tree problem*. Revue d’Analyse Numerique et de Theorie de l’Approximation 34, No. 1, 93-102, 2005.

## **2006:**

1. Pop, Petrica C.; Kern, W.; Still, G. A new relaxation method for the generalized minimum spanning tree problem. European J. Oper. Res. 170 (2006), no. 3, 900–908.
2. Birbil, S. Í.; Bouza, G.; Frenk, J. B. G.; Still, G. Equilibrium constrained optimization problems. European J. Oper. Res. 169 (2006), no. 3, 1108–1127.
3. Lin, Lai-Jiu; Still, Georg *Mathematical programs with equilibrium constraints: the existence of feasible points*. Optimization 55 (2006), no. 3, 205–219.

## **2007:**

1. Bouza, Gemayqzel; Still, Georg *Mathematical programs with complementarity constraints: convergence properties of a smoothing method*. Math. Oper. Res. 32 (2007), no. 2, 467–483.
2. Lopez, Marco; Still, Georg *Semi-infinite programming. (Invited Paper)* European J. Oper. Res. 180 (2007), no. 2, 491–518.
3. Birbil, . . ; Frenk, J. B. G.; Still, G. J. *An elementary proof of the Fritz-John and Karush-Kuhn-Tucker conditions in nonlinear programming*. European J. Oper. Res. 180 (2007),
4. Wang, Ligong; Broersma, Hajo; Hoede, Cornelis; Li, Xueliang; Still, Georg *Integral trees of diameter 6*. Discrete Appl. Math. 155 (2007), no. 10, 1254–1266.

**2008:**

1. Dür, Mirjam; Still, Georg *Interior points of the completely positive cone*. Electron. J. Linear Algebra 17 (2008), 48–53.
2. Bouza, Gemayqzel; Guddat, Jürgen; Still, Georg, *Critical sets in one-parametric mathematical programs with complementarity constraints*. Optimization 57 (2008), no. 2, 319–336.
3. Guerra Vázquez, F.; Rückmann, J.-J.; Stein, O.; Still, G. *Generalized semi-infinite programming: a tutorial*. J. Comput. Appl. Math. 217 (2008), no. 2, 394–419.
4. Wang, Ligong; Broersma, Hajo; Hoede, Cornelis; Li, Xueliang; Still, Georg *Some families of integral graphs*. Discrete Math. 308 (2008), no. 24, 6383–6391.

**Dissertation/Habilitation:**

- Still G., *Zur Approximation von Müntz-Reihen durch Müntz-Polynome*, Dissertation, Universität Mannheim (1983).
- Still G., *Defektminimierungsmethoden zur Lösung elliptischer Rand- und Eigenwertaufgaben*, Habilitationsschrift, Trier (1989).

**Book (as co-author or co-editor):**

- Faigle U., Kern W, Still G., *Algorithmic Principles of Mathematical Programming.*, Kluwer Texts in the Mathematical Sciences, 24. Kluwer Academic Publishers, Dordrecht, (2002).
- *Proceedings of the Fourth International Conference on Parametric Optimization and Related Topics*, “Approximation and Optimization”, Eds. Guddat/Jongen/Nozicka/Still /Twilt, Peter Lang Verlag, 382 pp., (1997)
- Special issue: *Smooth and Nonsmooth Optimization* - Edited by J. Brinkhuis, T. Illes, H. Frenk, G. Still, G. Weber and T. Terlaky, European Journal of Operational Research, Volume 157, Issue 1, Pages 1-266 (2004).
- Stein, Oliver; Still, Georg; Terlaky, Tamás; Weber, Gerhard-Wilhelm Editorial [5th EUROPT Workshop on Advances in Continuous Optimization]. Held in Reykjavik, June 30–July 1, 2006. CEJOR Cent. Eur. J. Oper. Res. 16 (2008), no. 2,