

CURRICULUM VITAE

Geir Dahl

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Position: Professor of Mathematics, Centre of Mathematics for applications (NFR Center of Excellence), Dept. of Mathematics and Dept. of Informatics, University of Oslo.

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Date of birth/Nationality: May 22, 1958. Norwegian.

Area of work: 1. Optimization: integer linear programming, polyhedral combinatorics, network optimization. 2. Matrix theory: combinatorial matrix theory, majorization. Member of *Mathematical programming Society* and *SIAM* (Society for Industrial and Applied Mathematics).

Education: Dr. Philos. (PhD), 1992, University of Oslo (Norway), mathematical optimization. Master of Science, 1983, University of Oslo, mathematical statistics. Master of Business and Adm., 1982, BI, Oslo.

Previous positions/experience: Professor of Mathematics, Dept. of Mathematics and Dept. of Informatics, University of Oslo, from 1999. Associate Professor, Dept. of Informatics, University of Oslo, 1994–1999. Visiting scientist, Sept. 2001 at the University of Rome LA SAPIENZA, Faculty of Engineering, Dept. of Operations Research. Visiting scientist July-Dec. 1998 at Institute for Systems Research and R.H. Smith School of Business, University of Maryland at College Park. Associate Professor, University of Oslo, since August 1994. Lecturer, University of Oslo, 1993–1994. Head

of research project “Combinatorial optimization” (University of Oslo, Telenor Research) 1995. Research scientist, 1988–1994, Norwegian Telecom Research, Kjeller, Norway. Visiting scientist 1-27/8 -1993 at Konrad-Zuse Zentrum für Informationstechnik, "Kombinatorische Optimierung", Berlin headed by Prof. M. Grötschel. Participated in the program "Anwendungsbezogene Optimierung und Steuerung" financed by DFG. Research scientist, 1985-1988, Institute for Energy Technology, Kjeller, Norway. Teaching experience from the gymnasium and high school.

Publications:

1. G. Dahl, "Combinatorial properties of Fourier-Motzkin elimination", *Electronic Journal of Linear Algebra*, 16 (2007), 334–346.
2. G. Dahl and T. Flatberg, “An Integer Programming Approach to Image Segmentation and Reconstruction Problems”. In *Geometric Modelling, Numerical Simulation, and Optimization: Applied Mathematics at SINTEF*: Springer Publishing Company 2007, p.461-481.
3. G. Dahl, “Majorization and distances in trees”. *Networks*, Vol. 50 (Issue 4) 2007, 251–257.
4. G. Dahl, “A note on a parameter relating traffic equilibria and system optimal routing”, *Applied Mathematics and Computation*, 191 (2007) 445–450.
5. M.O. Ball, G. Dahl, and T. Vossen, “Matchings in Connection with Ground Delay Program Planning”. 2006. Submitted.
6. R.A. Brualdi and G. Dahl, “The Bruhat shadow of a permutation matrix”, 2006. Chapter in “Mathematical papers in honour of Eduardo Marques de Sa”, Universidade de Coimbra, Departamento de Matemática, 2006. ISBN 978-972-8564-43-8.
7. G. Dahl and H. Minken, "Methods based on discrete optimization for finding road network rehabilitation strategies", 2006, To appear in *Computers and Operations Research*.
8. G. Dahl and N. Foldnes, “LP based heuristics for the multiple knapsack problem with assignment restrictions”. *Annals of Operations Research*, Volume 146, Number 1 (September), 2006, p. 91–104.

9. G. Dahl, J.M. Leinaas, J. Myrheim, E. Ovrum, "A tensor product matrix approximation problem in quantum physics". *Linear Algebra and Its Applications*, Vol. 420 (2007) 711-725. (Technical report, Department of Mathematics, University of Oslo, Pure Mathematics No. 3, ISSN 0806-2439 February 2006).
10. R.A. Brualdi and G. Dahl, "Constructing $(0,1)$ -matrices with given line sums and certain fixed zeros". In *Advances in Discrete Tomography and Its Applications*, Eds.: Herman, G.T., Kuba, A., Birkhäuser, Boston (2007).
11. R.A. Brualdi and G. Dahl, "Matrices of zeros and ones with given line sums and a zero block", *Electronic notes in discrete mathematics*, Vol. 20 (2005), 83-97.
12. G. Dahl and T. Flatberg, "A remark concerning graphical sequences", *Discrete Mathematics*, Volume 304, Issues 1-3, 28 November 2005, Pages 62-64.
13. G. Dahl and T. Flatberg, "Optimization and Reconstruction of $h\nu$ -convex $(0,1)$ -matrices", *Discrete Applied Mathematics*, 151 (2005), 93-105. (Prelim. version published in *Electronic Notes in Discrete Mathematics*, Volume 12, March 2003).
14. G. Dahl, D. Huygens, A.R. Mahjoub and P. Pesneau, "On the k edge-disjoint 2-hop-constrained paths polytope", *Oper. Res. Letters*, 2006, Vol. 34 (5): p.577-582.
15. G. Dahl and T. Flatberg, "An integer programming approach to image segmentation and reconstruction problems", 2004. Submitted.
16. G. Dahl, "A method for approximating symmetrically reciprocal matrices by transitive matrices", *Linear Algebra and Its Applications*, Vol. 403 (2005), 207-215.
17. G. Dahl, L. Gouveia and C. Requejo, "On formulations and methods for the hop-constrained spanning tree problem", In *Handbook of Optimization in Telecommunications*, Resende, Mauricio G.C.; Pardalos, Panos M. (Eds.), Springer, 2006.
18. G. Dahl, T. Flatberg, N. Foldnes and L. Gouveia, "The Jump Formulation for the Hop-Constrained Minimum Spanning Tree Problem", Febr. 2004. Submitted.

19. G. Dahl and T. Flatberg, "Reconstructing $(0,1)$ -matrices from projections using integer programming". To appear in *Computational Optimization and Applications*.
20. G. Dahl, "Tridiagonal doubly stochastic matrices", *Linear Algebra and Its Applications*, Vol. 390 (2004), 197–208.
21. G. Dahl, N. Foldnes and L. Gouveia, "A note on hop-constrained walk polytopes". To appear in *Operations Research Letters*.
22. G. Dahl and T. Flatberg, "Optimization and Reconstruction of hv-convex $(0,1)$ -matrices", *Electronic Notes in Discrete Mathematics*, Volume 12, March 2003.
23. G. Dahl, "A note on linear discrepancy", *Electronic Journ. of Linear Algebra*, Vol. 10 (2003), 77–80.
24. R.A. Brualdi and G. Dahl, "Matrices of zeros and ones with given line sums and a zero block", *Linear Algebra and Its Applications*, Vol. 371 (2003), 191–207.
25. G. Dahl, "The doubly graded matrix cone and Ferrers matrices", *Linear Algebra and Its Applications*, Vol. 368 (2003), 171–190.
26. G. Dahl and N. Foldnes, "Complete description of a class of knapsack polytopes", *Operations Research Letters*, Vol.31 (2003), 335–340.
27. G. Dahl and T. Flatberg, "Some constrained partitioning problems and majorization", *European Journal of Operational Research*, Vol. 158 (2) (2004), 434–443.
28. G. Dahl and B. Johannessen, "The 2-path network problem", *Networks* 43, No.3, 190-199 (2004).
29. G. Dahl and L. Gouveia, "On the directed hop-constrained shortest path problem", *Operations Research Letters* 32 (2004), pp 15–22.
30. R.A. Brualdi and G. Dahl, "Majorization-Constrained Doubly Stochastic Matrices". *Linear Algebra and Its Applications*, Vol.361, 75–97, 2003.
31. G. Dahl, "Principal majorization ideals and optimization". *Linear Algebra and Its Applications*, Vol.331, 113–130 2001.

32. G. Dahl, G. Storvik and A. Fadnes, "Large-scale integer programs in image analysis". *Operations Research*, Vol. 50 (2002), No. 3, 490–500.
33. G. Dahl and B. Realfsen, "The cardinality-constrained shortest path problem in 2-graphs". *Networks*, Vol. 36 (1), 1–8, 2000.
34. G. Dahl, "A note on diagonally dominant matrices". *Linear Algebra and Its Applications*, Vol. 317, 217–224, 2000.
35. G. Dahl, "An introduction to convexity", Report 279 (ISBN 82-7368-227-7), Department of Informatics, University of Oslo, Jan., 2000.
36. G. Dahl, "Majorization polytopes". *Linear Algebra and Its Applications*, Vol. 297, 157–175, 1999.
37. G. Dahl, "Matrix majorization". *Linear Algebra and Its Applications*, Vol. 288, 53–73, 1999.
38. G. Dahl, "Notes on polyhedra associated with hop-constrained paths", University of Oslo, Institute of Informatics. *Operations Research Letters* Vol. 25 (1999) 97–101.
39. G. Dahl, "The 2-hop spanning tree problem". *Operations Research Letters* Vol.23 (1998) 21–26.
40. G. Dahl, "Stable set polytopes for a class of circulant graphs". *SIAM Journal on Optimization*, Vol.9, No.2, 493–503, 1999.
41. S. Holm, B. Elgetun and G. Dahl, "Weight- and layout-optimized sparse arrays". Proc. Int. Workshop on Sampling Theory and Applications, Aveiro, Portugal, pp. 97-102, June 1997.
42. G. Dahl, "Majorization, polyhedra and statistical testing problems". *Linear Algebra and Its Applications*, Vol. 272, 205–225, 1998. (See Report 240, Feb. 1997, University of Oslo, Institute of Informatics.)
43. S. Holm, B. Elgetun and G. Dahl, "Properties of the beampattern of weight- and layout-optimized sparse arrays". *IEEE Trans. on ultrasonics, ferroelectrics and frequency control*, Vol. 44, No. 5, 983–992, 1997.
44. G. Dahl, "Polytopes related to the l_∞ -distance between vectors". *Operations Research Letters* Vol. 22 (1998) 49–54.

45. G. Storvik and G. Dahl, "Lagrangian based methods for finding MAP solutions for MRF models". *IEEE Transactions on Image Processing*, Volume 9, No. 3, 469–479 (2000).
46. G. Dahl, A. Martin and M. Stoer, "Routing through virtual paths in layered telecommunication networks", *Operations Research*, Vol. 47, No. 5, 1999. (see also Technical report, Telenor Research, FoU N78/95, Dec. 1995).
47. G. Dahl and F. Margot, "Weak k-majorization and polyhedra", *Mathematical Programming*, Vol.81 (1998), No.1, 37–53.
48. G. Dahl and M. Stoer, "A cutting plane algorithm for multicommodity survivable network design problems", *INFORMS Journal on Computing*, 10(1), Winter 1998, 1–11. (see also Preprint 3, Institute of Informatics, Apr. 1995.)
49. G. Dahl, "An introduction to convexity, polyhedral theory and combinatorial optimization". Komp. 67, Jan. 1996, Institute of Informatics, University of Oslo.
50. G. Dahl, "Polyhedra and optimization in connection with a weak majorization ordering. University of Oslo, Institute of Informatics, Preprint 10, Dec. 1994.
51. G. Dahl, "Polyhedra and optimization in connection with a weak majorization ordering". Springer *Lecture Notes in Computer Science*, Vol. 920, Integer programming and combinatorial optimization, (Ed. Balas and Clausen), Springer, 1995.
52. G. Dahl, K. Jörnsten, A. Løkketangen, "A tabu search approach to the channel minimization problem", *Proceedings ICOTA'95, Int. conference on optimization techniques and applications*, Chengdu, China, June 1995.
53. G. Dahl, K. Jörnsten, G. Løvnes and S. Svaet: "Graph Optimization Problems in Connection with the Management of Mobile Communications Systems", *Telecommunication Systems* 3 (1995) (319-339).
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55. M. Stoer and G. Dahl, "A polyhedral approach to multicommodity survivable network design", *Numerische Mathematik* 68 (1), 1994, 149-168.
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57. G. Dahl, "Some telecommunications network design problems and the bi-Steiner problem", NATO ASI Series, Vol. F 82, *Combinatorial Optimization*, (ed. M. Akgül et al.), Springer-Verlag Berlin-Heidelberg, 1992.
58. G. Dahl, "Contributions to the design of survivable directed networks", Dr. Philos. thesis, University of Oslo, Faculty of Mathematics. Also printed as Norwegian Telecom Research, TF R 48/91 (ISBN 82-423-0194-8).
59. G. Dahl and M. Stoer, "MULTISUN - mathematical model and algorithms", Norwegian Telecom Research, TF R46/92.

Technical reports:

1. G. Dahl, "Grafteori og optimering - en kort innføring". (In Norwegian.) Department of Mathematics, University of Oslo, Oct. 2001.
2. G. Dahl and B. Johannessen, "The 2-path network design problem". University of Oslo, Institute of Informatics. Report 292. Nov 2000. (Submitted)
3. G. Dahl, "A note on nonnegative diagonally dominant matrices". University of Oslo, Institute of Informatics. Report 269. April 1999.
4. G. Dahl, G. Størvik and A. Fadnes, "Large-scale integer programs in image analysis". University of Oslo, Institute of Informatics. Report 262. May 1998.
5. G. Dahl, "Polytopes related to some polyhedral norms". University of Oslo, Institute of Informatics. Report 226, Nov. 1996.
6. G. Dahl og G. Hasle, "Transportoptimering". SINTEF/Applied Mathematics, Oslo, Report STF42 A9622, Dec. 1996.

7. A. Eilertsen, R. Nylund, A. Solem og G. Dahl, "En matematisk optimeringsmodell og algoritmer for lokalisering av svitsjer i telenett", Norwegian Telecom Research, TF-notat N 19/94.
8. G. Dahl, "The design of survivable directed networks", Norwegian Telecom Research, TF R 8/94.
9. G. Dahl and M. Stoer, "A polyhedral approach to multicommodity survivable network design", Konrad-Zuse Zentrum, Berlin, SC 93-20, Aug. 1993.
10. G. Dahl, K. Jörnsten, G. Løvnes and S. Svaet, "Graph Optimization Problems in Connection with the Management of Mobile Communications Systems", Norwegian Telecom Research, TF R 48/92.
11. G. Dahl, "The design of survivable directed networks", Norwegian Telecom Research, TF-notat N 10/92.
12. G. Dahl, "Directed Steiner problems with connectivity constraints", Norwegian Telecom Research, TF-notes N42/90.
13. G. Dahl, "The bi-Steiner problem", Norwegian Telecom Research, TF-notes N11/90.
14. G. Dahl, Ø. Eriksen, R. Lorentzen, R. Nilsen, L. Skår, "Cable-TV - an optimization tool for design of cable television networks", Norwegian Telecom Research, TF-notes N1/90.
15. G. Dahl, R. Lorentzen, R. Nilsen, "The W-technique for resolving degeneracy in LP problems", Norwegian Telecom Research, TF-notes N7/90.
16. G. Dahl et al., technical reports on e.g. optimization models and algorithms in oil/gas transportation networks, 1984-1988, Institute for Energy Technology, Kjeller, Norway.
17. G. Dahl, "Majorization and pseudo-experiments". Statistical Research report, Institute of Mathematics, University of Oslo, 1984, University of Oslo.

Conference presentations and lectures:

1. G. Dahl and R.A. Brualdi, "Some Combinatorial Matrix Problems and Discrete Tomography", *Nordic Optimization Symp.*, University of Oslo, Oct. 18–20, 2007.
2. G. Dahl and R.A. Brualdi, "Some Combinatorial Matrix Problems and Discrete Tomography", Invited talk, Institute of Systems Research, University of Maryland, College Park, Oct. 1, 2007.
3. R.A. Brualdi and G. Dahl, "Constructing $(0,1)$ -matrices with given line sums and certain fixed zeros", *ILAS 2006 (Int. Linear Algebra Soc.)*, July 18–21, 2006, Amsterdam.
4. T. Flatberg and G. Dahl, "An integer programming approach to image segmentation and reconstruction problems", Euro XXI, July 2–5, 2006, Reykjavik, Iceland.
5. G. Dahl, J.M. Leinaas, J. Myrheim and E. Ovrup, "A tensor product matrix approximation problem in quantum physics, Invited talk at *Trends in Mathematics for Applications*, CMA, University of Oslo, June 19–20, 2006.
6. L. Gouveia, G. Dahl, T. Flatberg and N. Foldnes, "The Jump Formulation for the Hop-Constrained Minimum Spanning Tree Problem", INFORMS, The 8th INFORMS Telecommunications Conference, Dallas, USA, March 30 . April 2, 2006.
7. R.A. Brualdi and G. Dahl, "Matrices of zeros and ones with given line sums and a zero block", *Workshop in Discrete Tomography and Its Applications*, June 13–15, 2005, New York.
8. G. Dahl, "A method for approximating symmetrically reciprocal matrices by transitive matrices", Nordic Mathematical Prog. Society Conference, Linköping, Sweden, Oct. 22–23, 2004.
9. N. Foldnes and G. Dahl, "A randomized algorithm for the multiple knapsack problem with assignment restrictions", International Network Optimization Conference, October 27–29, 2003, Evry/Paris, France.
10. G. Dahl, "Matrices of zeros and ones and a zero block", *18th International Symposium on Mathematical Programming*, Copenhagen, Denmark, August 18–22, 2003.

11. G. Dahl, N. Foldnes and L. Gouveia, "On hop-constrained walk polytopes", *18th International Symposium on Mathematical Programming*, Copenhagen, Denmark, August 18-22, 2003.
12. G. Dahl and T. Flatberg, "Reconstructing (0,1)-matrices using Lagrangian decomposition", *18th International Symposium on Mathematical Programming*, Copenhagen, Denmark, August 18-22, 2003.
13. G. Dahl and T. Flatberg, "Reconstructing hv-convex (0,1)-matrices by optimization methods", 9th International Workshop on Combinatorial Image Analysis, May 14-16, 2003, Palermo, Italy.
14. G. Dahl, "Majorization and optimization", Nordic Mathematical Prog. Society Conference, Bergen, Norway, Sept. 20, 2002.
15. G. Dahl and T. Flatberg, "Discrete tomography and optimization", Nordic Mathematical Prog. Society Conference, Bergen, Norway, Sept. 21, 2002.
16. G. Dahl and N. Foldnes, "Complexity of certain multiple knapsack problems", Nordic Mathematical Prog. Society Conference, Bergen, Norway, Sept. 20, 2002.
17. G. Dahl and N. Foldnes, "Polyhedral Properties of certain 0/1 Knapsack Polytopes", IFORS 2002 (Int. operations research conf.), Edinburgh, Scotland, July 8-12, 2002.
18. G. Dahl and T. Flatberg, "Some partitioning problems and majorization", IFORS 2002 (Int. operations research conf.), Edinburgh, Scotland, July 8-12, 2002.
19. G. Dahl, "Principal majorization ideals and optimization", Invited lecture at the 10th International Linear Algebra Society Conference, Auburn, Alabama, USA, June 10-13, 2002.
20. G. Dahl, "Integer programs in image analysis", Invited lecture at the University of Rome, Sept. 26, 2001.
21. R.A. Brualdi and G. Dahl, "Majorization-Constrained Doubly Stochastic Matrices", 9th International Linear Algebra Society Conference, Haifa, Israel, June 25-29, 2001.
22. G. Dahl, "The 2-path network design problem and majorization". Invited lecture at "Optimization and simulation in telecommunications networks", University of Rome, May 3-5, 2001.

23. G. Dahl and L. Gouveia, "Generalizing cut inequalities for hop-constrained network design problem", INFORMS International, Maui, Hawaii, USA, June 17–20, 2001.
24. G. Dahl, "Dobbeltstokastiske matriser, polytooper og majorisering". Invited lecture at the annual meeting of The Norwegian Mathematical Society, University of Oslo, March 29, 2001.
25. G. Dahl, "The 2-path network design problem", *17th International Symposium on Mathematical Programming*, Atlanta, August 7–11, 2000.
26. G. Dahl, "Moderne optimering - mer enn å derivere !!" (in Norwegian). Foredrag ved Faglig-pedagogisk dag, Universitetet i Oslo, 4. jan., 2000.
27. G. Dahl, "Large-scale integer programs in image analysis", *Sixth SIAM Conference on Optimization*, Atlanta, May 10-12, 1999.
28. G. Dahl, G. Storvik and A. Fadnes, "Large-scale integer programs in image analysis", presentation at Mathematisches Forschungsinstitut Oberwolfach, Jan. 13., 1999.
29. G. Dahl, "Integer programs in image analysis". Seminar talk at R.H.Smith School of Business, University of Maryland at College Park, Dec. 6, 1998.
30. G. Dahl, "Stable set polytopes for a class of circulant graphs and application to the 2-hop spanning tree problem". Combinatorial Optimization '98, Université Libre de Bruxelles, April 15-17, 1998.
31. G. Dahl, "Some stable set polytopes and the 2-hop spanning tree problem". Invited talk at University of Linköping, Inst. of Mathematics, Jan. 21, 1998.
32. E. Bølviken, G. Dahl, "Fra reisende handelsmenn til statistikk - en guidet rundtur i anvendt matematikk" (in Norwegian). Foredrag ved Faglig-pedagogisk dag, Universitetet i Oslo, 5. jan., 1998.
33. G. Dahl, "Optimization in telecommunications". Invited talk at Norsk numerikkmøte (Norwegian Numerical Analysis meeting), Bergen, 3.-5. oktober, 1997.
34. G. Dahl, "Approximation of piecewise linear functions and constrained shortest paths". *16th International Symposium on Mathematical Programming*, Lausanne, Switzerland, August 24-29, 1997.

35. G. Dahl, "The 2-hop spanning tree problem and associated polytopes", *16th International Symposium on Mathematical Programming*, Lausanne, Switzerland, August 24-29, 1997.
36. G. Dahl, "Stable set polytopes for circulant graphs and spanning trees", Invited talk at University of Lisboa, Dept. of Operations Research, June 3, 1997.
37. G. Dahl, "Optimization in telecommunications". Invited talk at Royal Institute of Technology (KTH), Institute of Mathematics, Stockholm, Feb. 14, 1997.
38. G. Dahl and B. Realfsen, "Curve approximation and constrained shortest path problems", *Symposium über Operations Research (SOR 96)*, Braunschweig, 4-6. September, 1996.
39. G. Dahl, M. Stoer, A. Martin, "A polyhedral approach to a path selection problem in telecommunications", *Fifth SIAM Conference on Optimization*, Victoria, Canada, May 20-22, 1996.
40. G. Dahl, "Path packing problems arising in telecommunications", Invited talk, Brussels Free University, April 23, 1996.
41. G. Dahl, M. Stoer, A. Martin, "Routing in ATM networks". *INFORMS Meeting Fall 1995*, New Orleans, Oct. 29- Nov.1, 1995.
42. G. Dahl, M. Stoer, "Survivable network design in connection with SDH networks", *INFORMS Meeting summer 1995*, Singapore, June 26.-28., 1995.
43. G. Dahl, "Polyhedra and optimization in connection with a weak majorization ordering". 4th International *IPCO* conference (Integer programming and combinatorial optimization), Copenhagen, May 29-31, 1995.
44. G. Dahl, K. Jörnsten, A. Løkketangen, "A tabu search approach to the channel minimization problem", *ICOTA '95*, (12.-15. June, 1995) Int. conference on optimization techniques and applications. Chengdu University of Science and Technology, Chengdu, China.
45. G. Dahl, "Design of survivable telecommunication networks", *Optimization in production and transportation*, Workshop, Scheveningen, Holland 9.-11. November, 1994.

46. G. Dahl, "Discrete optimization in mobile communication networks", Invited talk, Konrad-Zuse-Zentrum, Berlin. August 1993.
47. G. Dahl and M. Stoer, "Multicommodity survivable network design", *TIMS/ORSA Joint National Meeting*, Chicago, May 16-19, 1993.
48. G. Dahl, "Graph Optimization Problems in Connection with the Management of Mobile Communications Systems". *Telecommunication Systems - modelling and analysis*, Nashville, USA, Feb. 27 - Mars 3, 1993 (Norwegian Telecom Research lecture notes, TF R 48/92).
49. G. Dahl, "The design of survivable directed networks". *The Second ORSA telecommunications Conference*, Boca Raton, Florida, March 9.-11., 1992 (Norwegian Telecom Research lecture notes, TF F 14/92).
50. G. Dahl, "The polyhedral approach to combinatorial optimization", lecture in connection with the Dr. Philos. dissertation, University of Oslo, February 4.- 5., 1992. (Norwegian Telecom Research lecture notes, TF F 3/92).
51. G. Dahl, "Some telecommunications network design problems and the bi-Steiner problem". *NATO Advanced Study Institute: New frontiers in the theory and practice of combinatorial optimization*, Ankara, Tyrkia, July 16.-23., 1990. (Norwegian Telecom Research lecture notes, TF F17/90).

Ph.D. committee etc.

- Member of Dr.Scient. committee Freadrik A. Dahl "Neural nets used for two-player zero-sum games", dissertation June 20, 2001.
- Opponent for the Dr. Oecon. thesis Mette Bjørndal, "Topics on electricity transmission pricing", Norwegian School of Economics and Business Administration, March 17, 2000.
- Opponent for the Dr. Scient. thesis A.K.M. Shadahat Hossain, "On the computation of sparse Jacobian matrices and Newton steps", Dept. of Informatics, University of Bergen, 26. Febr. 1998.
- Opponent for the Lic. thesis Di Yuan, "Optimal synthesis and multicommodity routing in telecommunication networks", University of Linköping, Inst. of Mathematics. Dissertation Jan. 20, 1998.

Head of Applied and Industrial Mathematics committee at the University of Oslo, 1998-2001.