

**Riccardo Cambini**  
**Curriculum Vitae**  
*November 2008*

**Addresses**

Department of Statistics and Applied Mathematics  
Faculty of Economics - University of Pisa - ITALY  
Via Cosimo Ridolfi, 10 - 56124 PISA (ITALY)  
Phone: +390502216249 - Fax: +390502216375  
E-mail: [cambric@ec.unipi.it](mailto:cambric@ec.unipi.it)  
Home Page: <http://cambric.ec.unipi.it/>

**Biographical Notes**

- Born on March 15, 1968.
- Graduated in Computer Sciences at the University of Pisa on June 14, 1991, discussing a research thesis on "Hypergraph Flows".
- PhD degree in Mathematics Applied to Economics achieved at the University of Trieste on October 27, 1995, discussing a research thesis on "Scalar and Vector Generalized Convexity".
- Since December 16, 2002, works as a full professor in Mathematics Applied to Economics at the University of Pisa, Faculty of Economics, Department of Statistics and Applied Mathematics.

**Research Fields**

Scalar and Vector Generalized Concavity/Convexity, Scalar and Vector Optimization, Nonlinear Programming, Quadratic Programming, Fractional Programming, Network Flows, Linear Economic Models, Mathematical Logistic Models.

**Current Research Topics**

Comparison among classes of vector valued generalized concave functions; optimality conditions in the image space; second order regularity conditions in the image space; generalized concavity and solution algorithms for fractional/multiplicative quadratic programs; computational methods for mathematical programming problems.

**Scientific Activities**

- Member of the International Scientific Committee (1997-2000, 2000-2004, 2004-2006, 2006-2009) of the Working Group on Generalized Convexity.
- Associate Editor of the Journal of Information & Optimization Sciences (ISSN: 0252-2667) since 2005 and of the International Journal of Mathematics and Analysis (ISSN: 0973-3604) since 2006.
- Reviewer of the Mathematical Reviews (ISSN 0025-5629) since March 2005.
- Unit scientific coordinator of the PRIN 2006 research programme "Generalized monotonicity: models and applications".

- Visiting Professor at the "A. Gary Anderson School of Management", University of California Riverside, May 12-15, 2008, where two lessons on "Linear Fractional Programming and its use in Data Envelopment Analysis" have been taken.
- Teacher of "Vector Optimization" at the ORSI Workshop on Optimization and Its Applications, held in Delhi (India), November 29 - December 3, 2007.
- Member of the "International scientific advisory committee" of the INTAS Summer school: Nonlinear analysis with applications in Economics, Energy and Transportation, held in Bergamo (Italy), June 5-9, 2006.
- Project coordinator of the research "Optimization Methods for Economics, Finance and Industry", supported by CNR (Consiglio Nazionale delle Ricerche) among the "Progetto GIOVANI - AGENZIA2000".
- From July 16 to August 21, 1997, is a visiting research fellow at the "Drake Centre - Department of Management Science" of the "University of Manitoba", Winnipeg (Manitoba, Canada). Some studies on vector invex and B-vex functions, and their applications to optimization, are carried on with Prof. Bector.
- Member of the International Organizing Committee of the 6th International Symposium on Generalized Convexity/Monotonicity, held in Karlovassi, Samos (Greece), August 30 - September 3, 1999.
- Acted as a referee for various international scientific journals ("Optimization", "Journal of Optimization Theory and Application", "Journal of Information & Optimization Sciences", "Journal of Global Optimization", "Journal of Mathematical Analysis and Applications", "Mathematical Methods of Operations Research - ex ZOR", "SIAM Journal of Optimization").
- Attended 15 International Conferences and 25 national ones, presenting some of his research papers.
- Author/coauthor of 27 papers published on international Journals or volumes, 10 papers published on national editions, 15 Technical Reports.
- Member of "Associazione per la Matematica Applicata alle Scienze Economiche e Sociali" (since 1993), Mathematical Programming Society (since 1997), Society for Industrial and Applied Mathematics (from 1998 to 2000).

### Main Faculty Activities

- Since November 2007 is the Chair of the PhD Program in "Mathematics for Economics".
- Since November 2006 is the Chair of the Degree Program in "Economics and Commerce".

### Teaching Duties

- In the last years teaches a course of "Calculus", a course of "Decision Theory", a course of "Computational Methods for Economics" and a course of "Matrix Analysis" at the Faculty of Economics, University of Pisa.

### International Conferences Attended

1. "IVth International Workshop on Generalized Convexity", held in Pécs (Hungary), August 31 - September 2, 1992, where the paper "A class of non-linear programs: theoretical and algorithmical results" has been presented.
2. "NetFlow93: Network Optimization, Theory and Practice", held in San Miniato-Pisa (Italy), October 3-7, 1993, where the paper "Flows on Hypergraphs" has been presented.
3. "5th Symposium on Generalized Convexity", held in Luminy-Marseille (France), June 17-21, 1996, where the papers "Generalized concavity for bicriteria functions" and "On the

- scalarization of pseudoconcavity and pseudomonotonicity concepts for vector valued functions" have been presented.
4. "2nd International Symposium on Operations Research with Applications in Engineering, Technology and Management (ISORA'96)", held in Guilin (P.R. China), December 11-14, 1996, where the paper "Generalized Concavity and Optimality Conditions in Vector Optimization" has been presented.
  5. "16th International Symposium on Mathematical Programming (ISMP'97)", held in Lausanne (Switzerland), August 24-29, 1997, where the talk "Nonsmooth Generalized Concave Scalar Functions" has been taken.
  6. "6th International Symposium on Generalized Convexity/Monotonicity", held in Karlovassi, Samos (Greece), August 30 - September 3, 1999, where the paper "First and Second Order Characterizations of a Class of Pseudoconcave Vector Functions" has been presented.
  7. "Decision Theory and Optimization in Theory and Practice", workshop held in Kloster Banz (Germany), March 8-10, 2001, where the talk "Necessary Optimality Conditions in Vector Optimization" has been taken and the paper "Coercivity Concepts and Recession Function in Constrained Problems" has been presented by the coauthor.
  8. "International Conference of Optimization and Optimal Control (ICOOC 2001)", held in Tainan (Taiwan), June 1-4, 2001, where the talk "Pseudoaffine Quadratic Fractional Functions" has been taken.
  9. "IV International Conference in Stochastic Geometry, Convex Bodies and Empirical Measures", held in Tropea, Vibo Valentia (Italy), September 24-28, 2001, where the talks "On generalized convexity of quadratic fractional functions" and "A note on a particular quadratic programming problem" have been taken.
  10. "18th International Symposium on Mathematical Programming (ISMP'03)", held in Copenhagen (Denmark), August 18-22, 2003, where the paper "Mixed type duality for multiobjective optimization problems with set constraints" has been presented.
  11. "8th International Symposium on Generalized Convexity and Generalized Monotonicity (GCM8)", held in Varese (Italy), July 4-8, 2005, where the talk "A unifying approach to solve a class of parametrically-convexifiable problems" has been taken.
  12. "INTAS Summer school: Nonlinear analysis with applications in Economics, Energy and Transportation", held in Bergamo (Italy), June 5-9, 2006, where the talk "Multiobjective Problems with Set Constraints: from Necessary Optimality Conditions to Duality Results" has been taken.
  13. "XXII European Conference on Operational Research", held in Prague (Czech Republic), July 8-11, 2007, where the talks "Global optimization of a generalized quadratic program" and "A branch and bound approach for a class of d.c. programs" have been taken.
  14. "40th Annual Convention of Operational Research Society of India", held in Delhi (India), December 4-6, 2007, where the talk "A parametric approach in global optimization: the optimal level solutions method" has been taken.
  15. "9th International Symposium on Generalized Convexity and Generalized Monotonicity (GCM9)", held in Kaohsiung (Taiwan ROC), July 21-25, 2008, where the talk "Global optimization of a generalized linear program" has been taken.

**Main Papers**

1. Cambini R. (1994), "A class of non-linear programs: theoretical and algorithmical results", in *Generalized Convexity, Proceedings of the IVth International Workshop on Generalized Convexity, held in Pécs (Hungary), August 31 - September 2, 1992*, edited by S. Komlósi, T. Rapsák and S. Schaible, *Lecture Notes in Economics and Mathematical Systems*, vol.405, Springer-Verlag, Berlin, pp.294-310.
2. Cambini R. (1996), "Some new classes of generalized concave vector-valued functions", *Optimization*, vol.36, n.1, pp.11-24.
3. Cambini R. (1996), "Generalized Concavity and Optimality Conditions in Vector Optimization", in *Operations Research and its Applications, Proceedings of the 2nd International Symposium on Operations Research with Applications in Engineering, Technology and Management (ISORA'96), held in Guilin (P.R. China), December 11-14, 1996*, edited by D.Z. Du, X.S. Zhang and K. Cheng, *Lecture Notes in Operations Research*, vol.2, World Publishing Corporation, Beijing, pp.172-180.
4. Cambini A., Martein L. and R. Cambini (1997), "Some optimality conditions in multiobjective programming", in *Multicriteria Analysis, Proceedings of the XI International Conference on MCDM, held in Coimbra (Portugal), August 1-6, 1994*, edited by J. Climaco, Springer-Verlag, Berlin, pp.168-178.
5. Cambini R., Gallo G. and M.G. Scutellà (1997), "Flows on Hypergraphs", in *Mathematical Programming, Series B*, vol.78, n.2, pp.195-217.
6. Cambini A., Martein L. and R. Cambini (1997), "A new approach to second order optimality conditions in vector optimization", in *Advances in Multiple Objective and Goal Programming, Proceedings of the 2nd International Conference in Multi-Objective Programming and Goal Programming (MOPGP'96), held in Torremolinos-Málaga (Spain), May 16-18, 1996*, edited by R. Caballero, F. Ruiz and R. Steuer, *Lecture Notes in Economics and Mathematical Systems*, vol.455, Springer-Verlag, Berlin, pp.219-227.
7. Cambini R. (1998), "Composition Theorems for Generalized Concave Vector Valued Functions", *Journal of Information & Optimization Sciences*, vol.19, n.1, pp.133-150.
8. Cambini R. (1998), "Generalized Concavity for Bicriteria Functions", in *Generalized Convexity, Generalized Monotonicity: Recent Results, Proceedings of the Fifth Symposium on Generalized Convexity, held in Luminy-Marseille (France), June 17-21, 1996*, edited by J.-P. Crouzeix, J.-E. Martinez-Legaz and M. Volle, *Nonconvex Optimization and Its Applications*, vol.27, Kluwer Academic Publishers, Dordrecht, pp.439-451.
9. Cambini R. and S. Komlósi (1998), "On the Scalarization of Pseudoconcavity and Pseudomonotonicity Concepts for Vector Valued Functions", in *Generalized Convexity, Generalized Monotonicity: Recent Results, Proceedings of the Fifth Symposium on Generalized Convexity, held in Luminy-Marseille (France), June 17-21, 1996*, edited by J.-P. Crouzeix, J.-E. Martinez-Legaz and M. Volle, *Nonconvex Optimization and Its Applications*, vol.27, Kluwer Academic Publishers, Dordrecht, pp.277-290.
10. Cambini R. (1998), "Second Order Optimality Conditions in Multiobjective Programming", *Optimization*, vol.44, pp.139-160.
11. Cambini R. and S. Komlósi (2000), "On Polar Generalized Monotonicity in Vector Optimization", *Optimization*, vol.47, pp.111-121.
12. Cambini R. and L. Martein (2001), "First and Second Order Characterizations of a Class of Pseudoconcave Vector Functions", in *Generalized Convexity and Generalized Monotonicity, Proceedings of the Sixth International Symposium on Generalized Convexity and Monotonicity, held in Karlovassi-Samos (Greece), August 30 - September 3, 1999*, edited by N. Hadjisavvas, J.-E. Martinez-Legaz and J.P. Penot, *Lecture Notes in Economics and Mathematical Systems*, vol.502, Springer, Berlin, pp.144-158.

13. Cambini R. and C. Sodini (2002), "A finite algorithm for a particular d.c. quadratic programming problem", *Annals of Operations Research*, vol.117, ISSN 0254-5330, pp.33-49.
14. Bector C.R. and R. Cambini (2002), "Generalized b-invex vector valued functions", *Journal of Statistics & Management Systems*, vol.5, n.1-3, ISSN 0972-5010, pp.141-173.
15. Cambini R. and L. Carosi (2002), "On generalized convexity of quadratic fractional functions", *Proceedings of the IV International Conference in Stochastic Geometry, Convex Bodies, Empirical Measures and Applications to Engineering Science, Tropea (Italy), September 24-29, 2001, Rendiconti del Circolo Matematico di Palermo, Series II, Suppl.70*, pp.155-176.
16. Cambini R. and C. Sodini (2003), "A Finite Algorithm for a Class of Nonlinear Multiplicative Programs", *Journal of Global Optimization*, vol.26, n.3, ISSN 0925-5001, pp.279-296.
17. Cambini R. and L. Carosi (2003), "Coercivity Concepts and Recession Function in Constrained Problems", *International Journal of Mathematical Sciences*, vol.2, n.1, ISSN 0972-754X, pp.83-96.
18. Cambini R. and L. Carosi (2004), "On generalized linearity of quadratic fractional functions", *Journal of Global Optimization*, vol.30, n.2, ISSN 0925-5001, pp.235-251.
19. Betti G., Cheli B. and R. Cambini (2004), "A statistical model for the dynamics between two fuzzy states: theory and an application to poverty analysis", *Metron International Journal of Statistics*, vol.LXII, n.3, ISSN 0026-1424, pp.391-411.
20. Cambini R. and L. Carosi (2005), "Duality in multiobjective optimization problems with set constraints", in *Generalized Convexity, Generalized Monotonicity and Applications, Proceedings of the Seventh International Symposium on Generalized Convexity and Monotonicity, held in Hanoi (Vietnam), August 27-31, 2002*, edited by A. Eberhard, N. Hadjisavvas and D.T. Luc, *Nonconvex optimization and its applications*, vol.77, ISBN 0-387-23638-4, Springer, Berlin, pp.131-146.
21. Cambini R., Carosi L. and S. Schaible (2005), "Duality in fractional programming problems with set constraints", in *Generalized Convexity, Generalized Monotonicity and Applications, Proceedings of the Seventh International Symposium on Generalized Convexity and Monotonicity, held in Hanoi (Vietnam), August 27-31, 2002*, edited by A. Eberhard, N. Hadjisavvas and D.T. Luc, *Nonconvex optimization and its applications*, vol.77, ISBN 0-387-23638-4, Springer, Berlin, pp.147-160.
22. Cambini R. and A. Marchi (2005), "A note on the connectedness of the efficient frontier", *Journal of Interdisciplinary Mathematics*, vol.8, n.1, ISSN 0972-0502, pp.21-37.
23. Cambini R. and C. Sodini (2005), "Decomposition methods for solving nonconvex quadratic programs via branch and bound", *Journal of Global Optimization*, vol.33, n.3, ISSN 0925-5001, pp.313-336.
24. Cambini R., Riccardi R. and U. Yuceer (2007), "An approach to discrete convexity and its use in an optimal fleet mix problem", in *Generalized Convexity and Related Topics, I.V. Konnov, D.T. Luc, A.M. Rubinov (Eds.), Lecture Notes in Economics and Mathematical Systems*, vol. 583, ISBN 3-540-37006-4, Springer, Berlin, pp.133-148.
25. Cambini R. and C. Sodini (2007), "An unifying approach to solve a class of parametrically-convexifiable problems", in *Generalized Convexity and Related Topics, I.V. Konnov, D.T. Luc, A.M. Rubinov (Eds.), Lecture Notes in Economics and Mathematical Systems*, vol. 583, ISBN 3-540-37006-4, Springer, Berlin, pp.149-166.
26. Cambini R. (2007), "Multiobjective problems with set constraints: from necessary optimality conditions to duality results", in *Nonlinear analysis with applications in Economics, Energy and Transportation*, A. Allevi, M. Bertocchi, A. Gnudi and I.V. Konnov (Eds.), ISBN 978-88-95184-22-7, Bergamo University Press, Bergamo (Ita), pp.25-64.

27. Cambini R. and C. Sodini (2007), "Global optimization of a generalized quadratic program", Report n°299, Department of Statistics and Applied Mathematics, University of Pisa.
28. Cambini R. and C. Sodini (2008), "A sequential method for a class of box constrained quadratic programming problems", *Mathematical Methods of Operations Research*, vol.67, n.2, pp.223-243. ISSN 1432-2994.
29. Cambini R. and C. Sodini (2008), "A computational comparison of some branch and bound methods for indefinite quadratic programs", *Central European Journal of Operations Research*, vol.16, n.2, pp.139-152, 2008. ISSN 1435-246X.
30. Cambini R. and R. Riccardi (2008, in print), "Theoretical and algorithmic results for a class of hierarchical fleet mix problems", *European Journal of Operational Research*.
31. Cambini R. and R. Riccardi (2008), "On discrete quasiconvexity concepts for single variable scalar functions", Report n°305, Department of Statistics and Applied Mathematics, University of Pisa.
32. Cambini R. and C. Sodini (2008), "Global optimization of a generalized linear program", Report n°312, Department of Statistics and Applied Mathematics, University of Pisa.