

Preface

Special Issues on Vector Variational Inequalities

Two special issues are edited on the topic of vector variational inequalities (in short, VVI). These issues are devoted to Professor Franco Giannessi in honour of his 68th birthday and pioneer work on VVI. It is a great honour and pleasure to devote these issues to our long-term mentor and friend, Franco Giannessi.

The VVI problem was introduced by Professor Franco Giannessi in the 1978 Erice Conference, see his seminal paper “Theorems of the Alternative, Quadratic Programs, and Complementarity Problems”, in the proceedings: *Variational Inequalities and Complementarity Problems*, edited by R. W. Cottle, F. Giannessi, and J.L. Lions. VVI is a new mathematical model for equilibria, which do not imply the minimum (or maximum) of any functional. This problem has received extensive attention in the last two decades and led to a new field, known as ‘VVI’.

The research of VVI has been further advanced by the following book: *Vector Variational Inequalities and Vector Equilibria* (532 pages), edited by Franco Giannessi (published by Kluwer Academic Publishers in 2000).

These two special issues include the recent developments on VVI. This second issue contains 7 papers, in addition to a list of selected publications of Professor Franco Giannessi. The summaries of the 7 papers in this issue are listed below:

Global stability of weak vector variational inequalities was studied in the paper by Cheng and Zhu. More specifically, upper and lower semi-continuities of the solution set mapping were established.

The first paper by Khanh and Luu studied upper semi-continuity of the solution set mapping of parametric set-valued vector quasivariational inequalities without monotonicity.

The second paper of Khanh and Luu obtained existence results of a solution for set-valued vector quasivariational inequalities in terms of pseudomonotonicity condition.

Set-valued vector variational inequalities with operator solutions were investigated by Kum and Kim. The existence of a solution of this type of vector variational inequalities was established.

In the paper by Lee and Lee, a nondifferentiable convex vector optimization problem was studied. Seven kinds of vector variational inequalities

with subdifferentials were formulated and relations among solution sets of such vector variational inequalities and the convex vector optimization problem were explored.

In the paper by Lin, some existence theorems of simultaneous equilibrium problems were established. Applications to system of mathematical programs and generalized vector quasi-saddle point problems were given.

Existence results of vector variational inequalities were obtained by Zheng by assuming semi-monotonicity.

Professor Panos Pardalos, the Editor-in-Chief of *Journal of Global Optimization*, suggests the idea to devote the two special issues to Professor Franco Giannessi. We are grateful to him for his constant encouragement to edit the special issues and his kind assistance during the preparation and publication of the issues. We are thankful to all the reviewers and the authors of this issue for their contributions.

X.Q. Yang and J.C. Yao
Guest Editors

A list of selected publications of Professor Franco Giannessi

Journal Papers

1. "On the minimization of a linear function with linear constraints". *OR* 69, pp. 823–831. Tavistock Publications, London, 1970.
2. "A sequential algorithm for the solution of nonconvex quadratic programming problems". In "Minimization Algorithms, Mathematical Theories and Computer Results". Academic Press, New York, 1972, pp. 61–102.
3. "Algorithms for the solution of quadratic nonconvex and structured problems. Applications to integer linear problems". In "Proceedings of the Fourth Conference on Probability Theory". Editura Acad. R. S. R., Bucharest, 1973, pp. 519–532.
4. "Functional aspects of dynamic programming. General results". *Control Cybernet.* 2 (1973), no. 3–4, pp. 31–42.
5. "Nonconvex quadratic programs, linear complementarity problems, and integer linear programs". Jointly with E. Tomasin. In "Fifth Conference on Optimization Techniques, Part I". pp. 437–449. *Lecture Notes in Comput. Sci.* Vol. 3, Springer, Berlin, 1973.
6. "Connections between nonlinear and integer programming problems". Jointly with F. Niccolucci. *Symposia Mathematica*, Vol. XIX. Academic Press, London, 1976, pp. 161–176.
7. "Continued fractions and explicit solutions of a particular discrete optimization problem". *Discrete Appl. Math.* 1 (1979), no. 4, pp. 261–275.
8. "Decomposition of mathematical programs by means of theorems of alternative for linear and nonlinear systems". Jointly with G. Castellani. In "Survey of Mathematical Programming". Vol. 2, pp. 423–439, North-Holland, Amsterdam-Oxford-New York, 1979.
9. "Theorems of alternative, quadratic programs and complementarity problems". In "Variational Inequalities and Complementarity Problems". Wiley, Chichester, 1980, pp. 151–186.

10. "Complementarity problems and their applications to structural engineering". In "Methods and Algorithms for Optimization", pp. 507–514, Coll. Atti Congr., Pitagora, Bologna, 1984.
11. "Theorems of the alternative and optimality conditions". *J. Optimiz. Theory and Appl.* 42 (1984), no. 3, pp. 331–365.
12. "Theorems of the alternative for multifunctions with applications to optimization: general results". *J. Optimiz. Theory Appl.* 55 (1987), no. 2, pp. 233–256.
13. "On a generalization of F. John theorem for constrained extremum problems". In "Advances in Mathematical Optimization". pp. 52–62, Math. Res., 45, Akademie-Verlag, Berlin, 1988.
14. "Necessary optimality conditions via image problem". Jointly with M. Pappalardo and L. Pellegrini. In "Nonsmooth Optimization and Related Topics". pp. 185–217, Ertore Majorana Internat. Sci. Ser. Phys. Sci., 43, Plenum, New York, 1989.
15. "A problem on convex functions". *J. Optimiz. Theory Appl.* 59 (1988) p. 525.
16. "Semidifferentiable functions and necessary optimality conditions". *J. Optimiz. Theory Appl.* 60 (1989), no. 2, pp. 191–241.
17. "General optimality conditions via a separation scheme". In "Algorithms for Continuous Optimization". pp. 1–23, NATO Adv. Sci Inst. Ser. C Math. Phys. Sci., 434, Kluwer, Dordrecht, 1994.
18. "A remark on infinite-dimensional variational inequalities". In "Equilibrium Problems with Side Constraints. Lagrangean Theory and Duality". *Matematiche (Catania)* 49 (1994), no. 2, pp. 243–247.
19. "Separation of sets and gap functions for quasi-variational inequalities". In "Variational Inequalities and Network Equilibrium Problems". pp. 101–121, Plenum, New York, 1995.
20. "On some connections among variational inequalities, combinatorial and continuous optimization". In "Applied Mathematical Programming and Modeling, II". *Ann. Oper. Res.* 58 (1995), pp. 181–200.
21. "Images, separation of sets and extremum problems". Jointly with T. Rapcsák. In "Recent Trends in Optimization Theory and Applications". pp. 79–106, World Sci. Publishing, River Edge, NJ, 1995.
22. "Some remarks on penalization for variational inequalities and generalizations". In "Nonlinear Optimization and Applications", edited by G. Di Pillo and F. Giannessi, Plenum, New York, pp. 171–179.
23. "A common understanding or a common misunderstanding?" *Numer. Func. Anal. Optimiz.*, Vol. 16, no. 10, Marcel Dekker, New York, 1996, pp. 1359–1363.
24. "Optimal control problems via exact penalty functions". Jointly with V.F. Demyanov and V.V. Karelin. *J. Global Optimiz.* Vol. 12, 1998, pp. 215–223.
25. "Optimal Control for an Obstacle Problem". Jointly with B.D. Craven. Tech. Report No. 232 of Dept. of Mathematics, Univ. of Pisa, Seres Optimization, Oct. 1997, pp. 1–6.
26. "Embedding variational inequalities and their generalizations into a separation scheme" *J. Inequal. Appl.* Vol. 1, Gordon and Breach, 1997, pp. 215–223.
27. "On connections among separation, penalization and regularization for variational inequalities with point-to-set operators". *Rendiconti del Circolo Matematico di Palermo, Serie II, No. 48, Via Archirafi 34, Palermo.* 1997, pp. 137–145.
28. "On Minty variational principle". In "New trends in Mathematical Optimization", Kluwer, Dordrecht, 1997, pp. 93–99.
29. "Sensitivity for variational inequalities. Applications to network flow problems". Jointly with L. Boeri and L. VolpiceIIi. Proceedings of National Meeting of "Research Project on Transportation" of Italian National Research Council, Roma, 1997, pp. 1–9.

30. "Connections between nonlinear and integer programming". Jointly with F. Tardella. In "Handbook of Combinatorial Optimization" Vol. 1, edited by D.-Z. Du and P.M. Pardalos, Kluwer, Dordrecht, 1999, pp. 149–188.
31. "A multifunction approach to extremum problems having infinite dimensional image. I: Composition and selection". Jointly with A. Uderzo. *Rendiconti del Seminario Matematico dell' Univ. di Modena*, Vol. XL VI, 1997, pp. 771–785.
32. "On the equivalence, via relaxation-penalization, between vector generalized systems". Jointly with C. Antoni. *Acta Mathematica Vietnamica*, Vol. 22, No. 2, 1997, pp. 567–589.
33. "Optimal control problems and penalization". Jointly with V.F. Demyanov and V.V. Karelin. In "Nonlinear Optimization and Related Topics" edited by G. Di. Pillo and F. Giannessi, Kluwer, Dordrecht, 2000, pp. 67–78.
34. "On the theory of vector optimization and variational inequalities. image space analysis and separation". In "Vector Variational Inequalities and Vector Equilibria. Mathematical Theories" edited by F. Giannessi. Series "Nonconvex Optimization and its Applications", Kluwer, Dordrecht, 2000, pp. 141–215.
35. "Regularization of noncoercive quasi-variational inequalities". Jointly with A.A. Khan. *Control and Cybernetics*, Vol. 29, no. 1, Polish Academy of Sciences, Warsaw, 2000, pp. 91–110.
36. "Theorems of the alternative and optimization". In "Encyclopedia of Optimization" edited by C.A. Floudas and P.M. Pardalos, Kluwer, Dordrecht, 2001, pp. 437–444.
37. "Image space approach to optimization". In "Encyclopedia of Optimization" edited by C.A. Floudas and P.M. Pardalos, Kluwer, Dordrecht, 2001, pp. 457–464.
38. "Some remarks on minimum principles". In "Proceedings of the International Conference on Convex Analysis and Optimization", edited by N. Hadjisavvas and P.M. Pardalos, Kluwer, Dordrecht, 2001, pp. 75–103.
39. "On the existence of Lagrange multipliers". *Atti del Seminario Matematico dell' Universita' di Messina, Serie II*, No. 7, 2001, pp. 1–20.
40. "On the penalization approach to optimal control problems". Jointly with V.F. Dem'yanov and V.V. Karelin. In "Control Applications 2000", V. Zakharov (Ed.), Pergamon Press, 2000, pp. 71–74.
41. "Image space analysis for vector optimization and variational inequalities. scalarization". Jointly with L. Pellegrini. In "Combinatorial and Global Optimization", edited by P.M. Pardalos, A. Migdalas and R.E. Burkard, Kluwer, Dordrecht, 2001, pp. 153–215.
42. "Ultrastructural localization of the NADPH-diasphorase activity in the leydig cells of aging mice". Jointly with R. Ruffoli, M.A. Giambelluca, P. Soldani, L. Grasso, M. Gasperi and Francesco Giannessi. *Anatomy and Embryology*, Vol. 203, 2001, pp. 383–391.
43. "Studi Ricerche di M. Volpato nel campo dell a Programmazione Matematica". Jointly with G. Castellani. In "Seminario Mario Volpato", edited by E. Canestrelli and G. Castellani, published by Centro Stampa Universita' Ca' Foscari, Venice, 2002, pp. 19–52.
44. "A multifunction approach to extremum problems having infinite dimensional image. Necessary conditions for unilateral constraints". *Cybernet. Syst. Anal.* Vol. 3, 2002, pp. 39–51.
45. "A problem on Markov Chains". *RAIRO-Operations Research*, Vol. 36, No. 2, 2002, p. 173.
46. "On necessary conditions for infinite dimensional extremum problems". Jointly with G. Mastroeni and A. Underzo, *J. Global Optimiz.* Kluwer, Vol. 28, 2004, pp. 319–337.

Books

1. "Variational Inequalities and Complementarity Problems. Theory and Applications". Edited jointly with R.W. Cottle and J.-L. Lions. A Wiley-Interscience Publication. John Wiley & Sons, Ltd., Chichester, 1980.
2. "Optimization and Related Fields". Edited jointly with R. Conti and E. De Giorgi. Lecture Notes in Mathematics, 1190. Springer-Verlag, Berlin, 1986.
3. "Nonsmooth Optimization and Related Topics". Edited jointly with F.R. Clarke and V.F. Demyanov. Ettore Majorana International Science Series: Physical Sciences, 43. Plenum Press, New York, 1989.
4. "Nonsmooth Optimization: Methods and Applications". Gordon and Breach Science Publishers, Montreux, 1992.
5. "Variational Inequalities and Network Equilibrium Problems". Edited jointly with A. Maugeri. Plenum Press, New York, 1995.
6. "Nonlinear Optimization and Applications". Edited jointly with G. Di Pillo, Plenum, New York, 1996.
7. "Equilibrium Problems with Side Constraints. Lagrangian Theory and Duality. II". Edited jointly with A. Maugeri and M. De Luca. Special issue of Rendiconti del Circolo Matematico di Palermo, Series II, No. 48, Via Archirafi 37, Palermo, 1997.
8. "New Trends in Mathematical Optimization". Edited jointly with S. Komlosi and T. Rapcsak. Kluwer, Dordrecht, 1997.
9. "Nonlinear Optimization and Related Topics". Edited jointly with G. Di Pillo. Kluwer, Dordrecht, 1999.
10. "Vector Variational Inequalities and Vector Equilibria. Mathematical Theories". Kluwer, Dordrecht, 2000.
11. "Equilibrium Problems and Variational Methods". Edited jointly with A. Maugeri and P. Pardalos. Kluwer, Dordrecht, 2001.
12. "Optimization Theory. Recent Developments from Matrahaza". Edited jointly with P. Pardalos and T. Rapcsak. Kluwer, Dordrecht, 2001.
13. "Fare ed insegnare Matematica". (Ed.). Published by Accademia Navale di Livorno, 2001.
14. "Variational Analysis and Applications", Special issue of J. Global Optimiz. Vol. 28, nos. 3-4, 2004.
15. "Constrained Optimization and Image Space Analysis. Vol. I: Separation of Sets and Optimality Conditions". Plenum, New York (to appear in 2005).
16. "Constrained Optimization and Image Space Analysis. Vol. II: Duality, Variational Inequalities and Vector Problems". Plenum, New York (to appear in 2005).
17. "Variational Analysis and Applications", Edited jointly with A. Maugeri, Kluwer, Dordrecht, 2004.