

# NICOLAS HADJISAVVAS

## Professor

**Address:** Department of Product and Systems Design Engineering (DPSD)  
University of the Aegean  
84100 Hermoupolis, Syros, Greece  
**Tel:** ++30 697 7637227 - Fax: ++30 2810 97009 -Email: [nhad@aegean.gr](mailto:nhad@aegean.gr)  
**URL:** <http://www.syros.aegean.gr/users/nhad/>

## ACADEMIC POSITIONS

2002-today: Professor, DPSD  
1995-2002: Professor, Department of Mathematics, University of the Aegean  
1989-1995: Associate professor, Department of Mathematics, University of the Aegean  
1986-1989: Lecturer, National Technical University of Athens.

## ADMINISTRATIVE POSITIONS

For several years, he has been in the University of the Aegean:  
Chair of the Department of Mathematics,  
Vice chair of DPSD,  
Member of the Research Committee,  
Member of the board of Trustees (Διοικούσα Επιτροπή).

## UNDERGRADUATE STUDIES

Bachelors Degree: Physics, University of Athens 1976.

## POSTGRADUATE STUDIES

- DEA in Mathematical Physics: Université de Reims, France 1977.
- Ph.D.: Doctorat d'Etat, Université de Reims, France 1981.

## PROFESSIONAL SOCIETIES/INTERNATIONAL COMMITTEES

- Past chair of the Working Group on Generalized Convexity (475 members from 53 countries), 2003-2006. Interim Chair, October 2008-June 2009.
- American Mathematical Society.
- Mathematical Programming Society.

## EDITORIAL BOARDS - REFEREEING

- Member of the Editorial Board for the following ISI Journals:
  1. Journal of Optimization Theory and Applications;
  2. Optimization;
  3. Journal of Global Optimization;
  4. Optimization Letters.
- Referee for the following journals: Journal of Optimization Theory and Applications; SIAM Journal on Optimization; Mathematical Programming; Journal of Global Optimization; Optimization; Journal of Convex Analysis;

Optimization Letters; Mathematical Methods of Operations Research; Mathematics of Operations Research; Acta Mathematica Hungarica; Journal of Mathematical Analysis and Applications; Pacific Journal of Optimization; Applied Mathematics Letters; Applicable Analysis; Nonlinear Analysis; Journal of Statistics and Management Systems; Lecture Notes in Economics and Mathematical Systems; Annals of Operations Research; Computational Optimization and Applications; Journal of Interdisciplinary Mathematics; Journal of Nonlinear and Convex Analysis; Journal of Computational and Applied Mathematics; Journal of Inequalities in Pure and Applied Mathematics (Electronic); Serdica; International Journal of Mathematics and Mathematical Sciences, as well as for various international Conference Proceedings.

- Reviewer for Zentralblatt für Mathematik and for Mathematical Reviews.

### RESEARCH INTERESTS

Convex and Nonconvex Analysis, Nonsmooth Analysis, Generalized Convexity and Monotonicity, Variational Inequality Problems-Equilibrium Problems, Mathematical Foundations of Quantum Mechanics.

### BOOKS

1. D. Kravvaritis, G. Pantelidis, N. Hadjisavvas: *Ordinary Differential Equations* (in Greek). Ziti Publications, 1990, Thessaloniki (Textbook).
2. N. Hadjisavvas, D. Hughes-Hallett, I. Vakalis (eds): *Proceedings of the International Conference on the teaching of Mathematics* (July 3-6, 1998 Pythagorion, Samos, Greece), John Wiley and Sons, Inc., 1998.
3. N. Hadjisavvas, J.E. Martinez-Legaz, J.P. Penot (Eds): *Generalized Convexity/Monotonicity*, Springer-Verlag, 2001.
4. N. Hadjisavvas, P. Pardalos (Eds). *Advances in Convex Analysis and Global Optimization*, Kluwer Academic Publishers, 2001.
5. A. Eberhard, N. Hadjisavvas and D.T. Luc (Eds.), *Generalized Convexity, Monotonicity and Applications*, Springer, 2005.
6. N. Hadjisavvas, S. Komlosi and S. Schaible, *Handbook on Generalized Convexity and Generalized Monotonicity*, Springer, 2005.

### CHAPTERS IN BOOKS

1. N. Hadjisavvas, D. Kravvaritis, G. Pantelides: *On nonlinear monotone Operators with values in  $L(X,Y)$* , in: Constantine Caratheodory: An international Tribute. Th. Rassias, Editor. Word Scientific Publications Company (1990).
2. N. Hadjisavvas and S. Schaible: *Pseudomonotonicity and Quasimonotonicity in Variational Inequalities and Equilibrium Problems*, in “Generalized Convexity, Generalized Monotonicity”, J.P. Crouzeix, J.E. Martinez-Legaz, M. Volle (eds). Kluwer (1998).
3. N. Hadjisavvas and S. Schaible: *Generalized Monotone Single Valued Maps*, (ii) *Generalized Monotone Multi Valued Maps* (iii) *Generalized Monotonicity: Applications to Variational Inequalities and Equilibrium Problems*: three refereed articles in: *Encyclopedia of Optimization*, P. Pardalos and G. Floudas (eds), Kluwer Academic Publishers (2001).

4. N. Hadjisavvas: *Maximal Pseudomonotone Operators*, in: Recent advances in Optimization, G.P. Crespi, A. Guerraggio, E. Miglierina, M. Rocca (eds), Datanova Editrice (2003).
5. N. Hadjisavvas, S. Schaible: *Generalized Monotone Maps*, in: Handbook on Generalized Convexity and Generalized Monotonicity, Springer (2004).
6. N. Hadjisavvas: *Generalized Convexity, Generalized Monotonicity and Nonsmooth Analysis*, in: Handbook on Generalized Convexity and Generalized Monotonicity, Springer (2005).
7. N. Hadjisavvas: *Pseudomonotone Maps: Properties and Applications*, in: Encyclopedia of Optimization, P. Pardalos and G. Floudas (eds), Springer (2008).

## **PAPERS**

### **Papers in Journals**

1. N. Hadjisavvas: *Etude de certaines conséquences d' une interprétation subjective de la notion d' état*. Ann. Fond. Louis de Broglie, 3, 155-176 (1978).
2. N. Hadjisavvas and M. Mugur-Schachter: *Unbounded measures on the closed subspaces of a Hilbert space*. Lett. Nuovo Cim. 23, 439-443 (1978).
3. N. Hadjisavvas: *Non conservation du moment cinétique total, selon la Théorie Quantique des mesures, lors d' une mesure de spin*. Lett. Epist. 24, 14-20 (1979).
4. N. Hadjisavvas, F. Thieffine and M. Mugur-Schachter: *Study of Piron's system of questions and propositions*. Found. Phys. 10, 751 (1980).
5. N. Hadjisavvas: *The Maximum Entropy Principle as a consequence of the principle of Laplace*. J. Stat. Phys. 26, 807-815 (1981).
6. F. Thieffine, N. Hadjisavvas and M. Mugur-Schachter: *Supplement to a critique of Piron's system of questions and propositions*. Found. Phys. 11, 645-649 (1981).
7. N. Hadjisavvas: *Distance between states and statistical inference in Quantum Theory*. Ann. Inst. Henri Poincaré, 35, 287-309 (1981).
8. N. Hadjisavvas: *Properties of mixtures of non-orthogonal states*. Lett. Math. Phys. 5, 327-332 (1981).
9. N. Hadjisavvas, F. Thieffine and M. Mugur-Schachter: *Critical remark on Jauch's Program*. Lett. Nuovo Cim. 30, 530-532 (1981).
10. N. Hadjisavvas: *On the "Hidden Variables" theory of A. Bach*. Phys. Lett. 82A, 107-108 (1982).
11. N. Hadjisavvas: *On Cantoni's generalized transition probability*. Comm. Math. Phys. 83, 43-48 (1982).
12. M. Mugur-Schachter, N. Hadjisavvas: *The probabilistic-informational concept of an opacity functional*. Kybernetes, 11, 1890183 (1982).
13. N. Hadjisavvas: *The Role of the "Hidden Variables" of the Apparatus in Bell's Theorem*. Epist. Lett. 69.0, 1-3 (1983).
14. N. Hadjisavvas: *What a hidden variables theory is not*. Epist. Lett. 69.2, 5-8 (1983).
15. N. Hadjisavvas, A. K. Theophilou: *A rigorous formulation of the Kohn and Sham theory*. Phys. Rev. A30, 2183-2186 (1984).
16. N. Hadjisavvas, A. K. Theophilou: *A rigorous formulation of the Slater's transition-state theory for excited states*. Phys. Rev. A32, 720-724, (1985).
17. N. Hadjisavvas: *Metrics on the set of states of a  $W^*$ -algebra*. Lin. Alg. and its Appl. 84, 281-287 (1986).

18. N. Hadjisavvas, B. Nassopoulos and G. Pantelides: *Über die Existenz gemeinsamer Elemente bester Approximation bezüglich zweier Normen*. Manuscr. Math. 58, 245-252 (1987).
19. N. Hadjisavvas, B. Nassopoulos and G. Pantelides: *On the renorming of a vector space endowed with two norms and the simultaneous approximation problem*. Math. Annalen 280, 549-557 (1988).
20. N. Hadjisavvas, D. Kravvaritis, G. Pantelides, I. Polyrakis: *Nonlinear monotone Operators with values in  $L(X, Y)$* . J. Math. Anal. Appl. 140, 83-94 (1989).
21. N. Hadjisavvas, D. Kravvaritis, G. Pantelides, I. Polyrakis: *Hereditary order convexity in  $L(X, Y)$* . Rend. Circ. Mat. Palermo 38, 130-139 (1989).
22. N. Hadjisavvas, D. Kravvaritis, G. Pantelides: *Structural properties of nonlinear monotone Operators with values in  $L(X, Y)$* . Serdica 16, 246-248 (1990).
23. N. Hadjisavvas and S. Schaible: *On strong Pseudomonotonicity and (Semi)strict Quasimonotonicity*. J. Optim. Th. Appl. 79, 139-155 (1993).
24. N. Hadjisavvas, D. Kravvaritis and I. Polyrakis: *Weakly compact subsets of  $L_1(\mu, X)$  and  $bvca(\Sigma, X)$* . Rend. Circ. Mat. Palermo 48 (series II), 119-126 (1994).
25. N. Hadjisavvas, S. Schaible: *Quasimonotone Variational Inequalities in Banach Spaces*. J. Optim. Theory Appl. 90, 95-111 (1996).
26. A. Daniilidis, N. Hadjisavvas: *Existence Theorems for Vector Variational Inequalities*, Bull. Austr. Math. Soc. 54, 473-481 (1996).
27. A. Daniilidis, N. Hadjisavvas and S. Schaible: *Connectedness of the efficient set for three-objective quasiconcave optimization problems*. J. Optim. Theory Appl. 93, 517-524 (1997).
28. M. Bianchi, N. Hadjisavvas and S. Schaible: *Vector Equilibrium Problems with Generalized Monotone Bifunctions*. J. Optim. Theory Appl. 92, 527-542 (1997).
29. N. Hadjisavvas, S. Schaible: *From Scalar to Vector Equilibrium Problems in the Quasimonotone Case*. J. Optim. Theory Appl. Vol. 96, 297-309 (1998).
30. A. Daniilidis, N. Hadjisavvas: *Coercivity conditions and variational inequalities*. Mathematical Programming 86, 433-438 (1999).
31. A. Daniilidis and N. Hadjisavvas: *Characterization of Nonsmooth Semistrictly Quasiconvex and Strictly Quasiconvex Functions*, J. Optim. Theory Appl. Vol. 102, 525-536 (1999).
32. A. Daniilidis and N. Hadjisavvas: *On the Subdifferentials of Pseudoconvex and Quasiconvex Functions and Cyclic Monotonicity*, J. Math. Anal. Appl. Vol. 237, 30-42 (1999).
33. A. Daniilidis and N. Hadjisavvas: *On Generalized Cyclically Monotone Operators and Proper Quasimonotonicity*, Optimization Vol 47, 123-135 (2000).
34. A. Daniilidis, N. Hadjisavvas and J.E. Martinez-Legaz: *An appropriate subdifferential for quasiconvex functions*, SIAM J. on Optimization 12, 407-420 (2001).
35. N. Hadjisavvas, *The use of subdifferentials for studying generalized convex functions*, Journal of Statistics and Management Systems 5, 125-139 (2002).
36. M. Bianchi, N. Hadjisavvas and S. Schaible, *On pseudomonotone maps  $T$  for which  $-T$  is also pseudomonotone*, J. Conv. Anal. 10, 465-475 (2003).
37. N. Hadjisavvas, *Hadamard-type inequalities for quasiconvex functions*, J. Inequal. Pure Appl. Math. Vol 4, Issue 1, Article 13 (2003). (electronic).
38. N. Hadjisavvas: *Continuity and Maximality Properties of Pseudomonotone Operators*, J. Convex Anal. 10, 465--475 (2003).

39. D. Aussel and N. Hadjisavvas, *On Quasimonotone Variational Inequalities*, J. Optim. Theory Appl. 121, 223-228 (2004).
40. M. Bianchi, N. Hadjisavvas and S. Schaible, *Minimal Coercivity Conditions and Exceptional Families of Elements in Quasimonotone Variational Inequalities*, J. Optim. Theory Appl. 122, 1-17 (2004).
41. D. Aussel and N. Hadjisavvas, *Adjusted sublevel sets, normal operator and quasiconvex programming*, SIAM J. Optimization 16, 358-367 (2005).
42. M. Bianchi, N. Hadjisavvas and S. Schaible, *Exceptional families of elements for variational inequalities in Banach spaces*, J. Optim. Theory Appl. 129, 23-31 (2006).
43. N. Hadjisavvas and S. Schaible, *On a generalization of paramonotone maps and its application to solving the Stampacchia variational inequality*, Optimization 55, 593-604 (2006).
44. N. Hadjisavvas, *Translations of Quasimonotone Maps and Monotonicity*, Applied Mathematics Letters 19, 913-915 (2006).
45. F. Flores-Bazán, N. Hadjisavvas and C. Vera, *An optimal alternative theorem and applications to mathematical programming*, J. Global Optim. 37, 229-243 (2007).
46. M.R. Bai and N. Hadjisavvas, *Relaxed quasimonotone operators and relaxed quasiconvex functions*, J. Optim. Theory Appl. 138, 329-339 (2008).
47. L. C. Ceng, N. Hadjisavvas, S. Schaible, and J. C. Yao, *Well-Posedness for Mixed Quasivariational-Like Inequalities*, J. Optim. Theory Appl. 139, 109-125 (2008).
48. N. Hadjisavvas and S. Schaible, *Pseudomonotone\* maps and the cutting plane property*, J. Global Optim. 43, 565 - 575 (2009).
49. D. Aussel, Y. Garcia and N. Hadjisavvas, *Single-directional property of multivalued maps and variational systems*, SIAM J. Optim. 20, 1274-1285 (2009).
50. N. Hadjisavvas and H. Khatibzadeh, *Maximal monotonicity of bifunctions*, Optimization 59, 147-160 (2010).
51. L.-C. Ceng, N. Hadjisavvas and N.C. Wong, *Strong convergence theorem by a hybrid extragradient-like approximation method for variational inequalities and fixed-point problems*, J. Global Optim. 46, 635-646 (2010).
52. N. Hadjisavvas and D.T. Luc, *Second-order asymptotic directions of unbounded sets with application to optimization*, J. Convex Analysis 18, 181-202 (2011).
53. M. H. Alizadeh and N. Hadjisavvas, *Local boundedness of Monotone Bifunctions*, J. Global Optim. 53, 231-241 (2012).
54. H. Alizadeh, N. Hadjisavvas and M. Roohi, *Local Boundedness Properties for Generalized Monotone Operators*, J. Convex Analysis 19, 49-61 (2012).
55. N. Hadjisavvas, S. Schaible and N.C. Wong, *Pseudomonotone Operators: a Survey of the Theory and its Applications*, J. Optim. Theory Appl. 152, 1-20 (2012) (invited paper).
56. M. H. Alizadeh, N. Hadjisavvas, *On the Fitzpatrick transform of a monotone bifunction*, Optimization (to appear).

## CITATIONS

The ISI Web of knowledge gives 627 citations, excluding self-citations (h index = 16). Mathscinet (whose citation database starts on year 2000) mentions: “Nicolas

Hadjisavvas is cited 371 times by 198 authors”. Google Scholar gives 1221 citations (h index = 18). A lot of these papers were based mainly on his work and mention specifically that their main aim is to continue or generalize his results. Among these, the following 9 papers mention his work in their abstract:

1. Oettli W., Acta Mathematica Vietnamica, 22, 213, 1997.
2. Zhao Y.B., Isac, G., Journal of Optimization Theory and Applications, 105, 213-231, 2000.
3. Yang, Y., Numerical Mathematics, 22 141-146, 2000.
4. Kusakabe F., Journal of the Physical Society of Japan, 70, 2038-2048, 2001.
5. Benoist J., Popovici N., Journal of Optimization Theory and Applications 111, 81-116, 2001.
6. Kang M.K., Lee B.S., Applied Mathematical Letters 17, 889-896, 2004.
7. Chiang Y., Journal of Global Optimization, 47, 53-62, 2010.
8. Castellani M., Giuli M., Journal of Convex Analysis 19, 113-123 (2012).
9. Bot R.I., Grad S.-M., Journal of Convex Analysis 2012 (to appear)

The textbook of B.C. van Fraassen “Quantum Mechanics” mentions the “Hadjisavvas theorem” and makes this note: *This is a subject with history, starting by an inspired guess of Schroedinger and ending by the fully general results of Hadjisavvas*. The same result has been characterized by P. Bush (Studies in History and Philosophy of Modern Physics 33, 517-539, 2002) as “*fundamental*”.

## OTHER DISTINCTIONS

- Chair of the Working Group on Generalized Convexity (2003-2006 and 2008-2009), an international Society of 475 members from 53 countries <http://www.genconv.org>.
- Invited or keynote speaker in international conferences held in Barcelona (Spain) (twice), Varese (Italy), Erice (Italy), Isfahan (Iran) (3 times), Shanghai (China), Kaohsiung (Taiwan), Tainan (Taiwan), Alicante and Elche (Spain), Limoges (France), Delhi (India), Varanasi (India), Dhahran (Saudi Arabia), Aligarh (India), Milan (Italy).
- Invited Professor in several Universities, such as: Universidad de Concepcion, Chile; Université de Perpignan, France; Université de Pau, France; University of California at Riverside, USA (8 times); Catholic University of Milan, Italy (3 times), National Sun Yat-Sen University, Taiwan (3 times).
- Member of the program committee and/or organizing committee of several international conferences.