Curriculum Vitae et studiorum

Sofia Giuffrè

Education and Positions

- Degree in Mathematics, magna cum laude, University of Messina, Italy, on July 27th 1995.
- PhD in Applied Mathematics and Computer Sciences, University of Naples Federico II, March 2001. Thesis: Oblique Derivative Problem in the Plane for nonlinear elliptic operators with discontinuous coefficients".
- Post-doctoral researcher, University of Catania.
- Assistant Professor of Mathematical Analysis, "Mediterranea" University of Reggio Calabria from April 2001.
- In 2013 evaluated as qualified for an Associate Professor position in the field of Mathematical Analysis, Probability and Mathematical Statistics.
- Associate Professor in Mathematical Analysis, "Mediterranea" University of Reggio Calabria from November 2^{nd} 2017.

Teaching

Courses delivered for the Faculty of Engineering, "Mediterranea" University of Reggio Calabria:

- Calculus (A.Y. 2001-2002, A.Y. 2002-2003, A.Y. 2003-2004, A.Y. 2004-2005, A.Y. 2005-2006, A.Y. 2006-2007, A.Y. 2007-2008, A.Y. 2009-2010, A.Y 2015-2016, A.Y 2017-2018),

-Probability and Statistics (A.Y. 2004-2005, A.Y. 2006-2007, A.Y. 2007-2008),

-Probability (A.Y. 2010-2011, A.Y. 2011-2012, A.Y. 2012-2013, A.Y. 2013-2014, A.Y. 2014-2015, A.Y 2016-2017, A.Y. 2017-2018),

-Stochastic Processes (A.Y. 2003-2004),

-Mathematical Methods for Engineering (A.A. 2007-2008),

-Queue Theory (A.Y. 2003-2004, A.Y. 2004-2005, A.Y. 2006-2007, A.Y. 2007-2008),

-Mathematical Methods for Engineering and Queue Theory (A.Y. 2008-2009, A.Y. 2009-2010, A.Y. 2010-2011, A.Y. 2011-2012, A.Y. 2012-2013, A.Y. 2013-2014, A.Y. 2014-2015, A.Y. 2015-2016, A.Y 2016-2017, A.Y 2017/2018).

Almost all these courses belong to the List of Courses Ranked as Excellent by Their Students, Mediterranea University of Reggio Calabria.

Advanced Teaching

"Elements of Duality Theory", delivered for Training Programme on Nonlinear Analysis with Applications to Optimization and Game Theory at Aligarh Muslim University, Aligarh, India, November 16-19, 2011.

Research Projects

PRIN 2001- Simmetria, Forme geometriche, evoluzione e memoria nelle equazioni alle derivate parziali - Principal Investigator Prof. G. Talenti;

PRIN 2003 - Aspetti teorici ed applicativi di equazioni alle derivate parziali - Principal Investigator Prof. G. Talenti;

PRIN 2008 - Analisi Variazionale ed Equazioni alle Derivate Parziali - Principal Investigator Prof. A. Maugeri;

PROMIS (logistic PROcess Management and Intelligence System), Support: P.O.R 2000-2006 (Misure 3.16 e 3.7; D.M.593/2000, Art. 13) - Italian Ministry of Research - Italian Ministry of Economy, Calabria Regional Government;

AUTOMA (Automobile Logistic Management), Support: P.O.R 2000-2006 (Misure 3.16 e 3.7; D.M. 593/2000, Art.13) - Italian Ministry of Research - Italian Ministry of Economy, Calabria Regional Government;

INLOCO (Innovations in Coordinated Logistics), Support: Italian Ministry of Research - Italian Ministry of Economy, Calabria Regional Government;

TETRis Innovative Open Source Services over TETRA. Support: Italian Ministry of Research MIUR - grant "P.O.N. Ricerca e Competitivitï£¡ 2007-2013";

FINGERIMBALL- Anti-counterfeiting technologies and materials, and nanotechnology applications for authentication and protection of agri-food excellence. Support: Italian Ministry of Research MIUR - grant "P.O.N. Ricerca e Competitivitï£¡ 2007-2013".

Organizing Activity

Sofia Giuffrè was member of the Organizing Commitee of the following Conferences:

- International Workshop "Equilibrium Problems and Variational Models", Taormina, December 3-5, 1998.

- "Appia-Gulp-Prode 2003. Joint Conference on declarative programming", Reggio Calabria, September 3-5, 2003.

- 55th Course: "Variational Analysis and Applications" (Directors: L.Ambrosio, L.Caffarelli, A.Maugeri) of the International School of Mathematics "G.Stampacchia", Erice, May 9-17, 2009.

- 58th Course: "Variational Analysis and Applications" (Directors: N.Fusco, A.Maugeri, B.S.Mordukhovich) of the International School of Mathematics "G.Stampacchia", Erice, May 14-22, 2012.

- International Workshop "Variational Inequalities, Nash Equilibrium Problems and Applications", Catania, September 25-26, 2014.

- 63rd Course: “Variational Analysis and Applications” (Directors: P. Daniele - C. De Lellis - A. Maugeri - R.T. Rockafellar - M. Thra) of the International School of Mathematics “G.Stampacchia”, Erice, August 28- September 5, 2015.

- International Workshop “Variational Inequalities, Nash Equilibrium Problems and Applications”, Reggio Calabria, September 24-25, 2015.

- XIII Global Optimization Workshop, University of Minho, Braga, Portugal, 4-8 September, 2016.

- International Workshop “Variational Inequalities, Nash Equilibrium Problems and Applications", Catania, October 6-7, 2016.

- International Workshop “Variational Inequalities, Nash Equilibrium Problems and Applications", Reggio Calabria, March 8-9, 2018.

Sofia Giuffrè is organizer of the following Special Sessions

- “Optima and Equilibria: Theory and Applications”, 43nd Annual Conferenze AIRO, Vietri sul Mare, September 4-7, 2012 (together with Professor P.Daniele);
- “Partial Differential Equations and Applications to Unilateral Problems”, 8th European Conference on Elliptic and Parabolic Problems, Gaeta, May 26-30, 2014;
- “Variational Analysis and Applications to Equilibrium Problems”, 10th AIMS conference on Dynamical Systems, Differential Equations and Applications, Madrid, July 7-11, 2014 (together with Professor P.Daniele);
- “Elliptic and Parabolic Problems: Theoretical Aspects, Methods and Applications”, 9th European Conference on Elliptic and Parabolic Problems, Gaeta, May 23-27, 2016 (together with Professor A.Kogoj).

Sofia Giuffrè is co-organizer of the following courses and schools:

- “Minicorsi di Analisi Variazionale”, Reggio Calabria, May 12, 2014.

- "1^0 Corso Intensivo di Calcolo delle Variazioni", Catania, June 9-14, 2014.

Other scientific activities

Member of "Commissione Paritetica", "Commissione Scientifica", "Commissione Assegni di Ricerca", DIIES, Mediterranea University of Reggio Calabria.

Member of the Teaching Committee of the PhD in Information Engineering, Mediterranea University of Reggio Calabria.

Referee for Journals: Journal of Inequalities and Applications, Journal of Global Optimization, Optimization, Journal of Function Spaces and Application, Journal of Optimization Theory and Applications, Optimization and Engineering, International Journal of Differential Equations, Applicable Analysis, Abstract and Applied Analysis, Boundary Value Problems, Journal of Mathematical Finance, Computational & Applied Mathematics, Numerical Functional Analysis and Optimization, Operational Research, AAPP - Atti della Accademia Peloritana dei Pericolanti.

Reviewer for Mathematical Reviews.

Referee for the evaluation of project proposal on behalf of Miur, Italian Republic, and Czech Science Foundation, Czech Republic.

Member of U.M.I. (Unione Matematica Italiana), GNAMPA (National Group for Mathematical Analysis, Probability and their Applications), AIRO (Operational Research Society Italian Association).

Chairman in several Conferences.

Guest Editor (together with S.Battiato, G.M. Farinella, P.Daniele, L. Scrimali) of the Special Issue of Journal of Global Optimization "Variational Inequalities, Nash Equilibrium Problems and Applications".

Invited talks and seminars

- "Oblique derivative problem for nonlinear elliptic discontinuous operators in the plane", 8th International Conference on Differential Equations, Plovdiv, Bulgaria, August 8-23, 1997.

- "Oblique derivative problem for nonlinear elliptic discontinuous operators in the plane with quadratic growth", International Conference on Optimal Regularity in Elliptic, Hypoelliptic and Parabolic Problems, Levico Terme (TN), October 6-10, 1998.

- "Oblique derivative problem for elliptic and parabolic equations. Open problems", International Conference on Evolution Equations and Applications, Cortona (AR), May 9-14, 1999.

- "Problema di derivata obliqua di tipo emergente per equazioni ellittiche nel piano", Giornate nonlineari, Bologna, November 11-13, 1999.

- "On the strong solvability of a unilateral boundary value problem for nonlinear discontinuous operators in the plane", 32nd Workshop on Equilibrium Problems and Variational Models of the International School of Mathematics "G.Stampacchia", Erice (TP), June 23 - July 2, 2000.

- "Esistenza di soluzioni forti di problemi ellittici non lineari", Conference on Symmetries, Geometric Structure, Evolution and Memory in PDEs, Taormina (ME), February 7-9, 2001.

- "Existence of strong solutions of nonlinear elliptic problems", International Workshop on Singularity in Nonlinear Elliptic Problems, Roma, May 16-18, 2001.

- "Oblique derivative problem of emergent type for nonlinear elliptic operators in the plane", International Conference on Advances on Nonlinear PDEs, L'Aquila, June 5-8, 2002.

- "Strong solvability of nonlinear elliptic problems with discontinuous coefficients", First Joint Meeting AMS-UMI (Special Session on Nonlinear Elliptic and Parabolic Equations and Systems), Pisa, June 12-16, 2002.

- "Regularity and Existence Problems for Elliptic Non Variational Equations with Discontinuous Coefficients", 38th Workshop on "Variational Analysis and Applications" of the International School of Mathematics "G.Stampacchia", Erice, June 20-30, 2003.

- "Regolarità Hölderiana globale per equazioni ellittiche a coefficienti discontinui nel piano", XVII Congresso UMI, Milano, September 8-13, 2003.

- "Regolarità globale per soluzioni del problema di Dirichlet per sistemi ellittici con nonlinearità $q \geq 2$ e con andamenti naturali", "Aspetti teorici e applicativi di equazioni alle derivate parziali", Maiori, April 21-24, 2004.

- "Variational Inequalities and Generalized Lagrangean Theory. Applications to Equilibrium Problems", World Congress of Nonlinear Analysts 2004, Special session on Variational Inequalities and its Applications, Orlando, Florida, June 30 - July 7, 2004.

- "Strong Solvability of Boundary Value Contact Problem", "Equazioni a derivate parziali: aspetti metodologici, modellistica, applicazioni", Ragusa Ibla, 29 June - 2 July, 2005.

- "Global regularity for elliptic systems with q-nonlinearity, q>1", International Workshop on "Variational Analysis and Applications" of the International School of Mathematics "G. Stampacchia", Erice, July 5-14, 2006.

- "Regolarità globale per sistemi ellittici con non linearità q>1", XVIII Congresso U.M.I., Bari, September 24-29, 2007.

- "Global regularity for elliptic systems with q-nonlinearity, q>1", International Conference "Geometric Function Theory and Nonlinear Analysis", Ischia, October 11-14, 2007.

- "Some classes of projected dynamical systems in Banach spaces and equivalence results", International Workshop Complex Networks, Equilibrium and Vulnerability Analysis and Applications, Catania, March 8-11, 2008.

- "Projected Dynamical Systems and Applications to Networks on non Pivot Hilbert Spaces", World Congress of Nonlinear Analysts 2008, Special session on Variational Inequalities and its Applications, Orlando, Florida, July 2-9, 2008.

- "Weighted Traffic Equilibrium Problem in Non Pivot Hilbert Spaces", Minisymposia on "Variational Inequalities and Applications to Dynamic Network Equilibrium Problems", Joint SIMAI/SEMA Conference on Applied and Industrial Mathematics, Cagliari, June 21-25, 2010.

- "Weighted Traffic Equilibrium Problem in Non Pivot Hilbert Spaces", AIRO 2010, Italian Operational Research Society 41st Annual Conference, Session on "Variational Inequalities and Equilibrium Problems", Santa Trada (RC), September 7-10, 2010.

- "Weighted Traffic Equilibrium Problem in Non Pivot Hilbert Spaces with Long Term Memory", International Conference ICNAAM 2010, The 2nd Symposium on Variational Inequalities and Equilibrium Problems, Rodi, September 19-25, 2010.

- "Infinite Dimensional Duality and the Elastic-Plastic Torsion Problem", Workshop Variational Analysis in Optimization and Equilibria, Messina, June 22, 2011.

- "Variational approach for a general financial equilibrium problem", ISAAC 2011 (Special Session on "Optimization theory, variational analysis and nonlinear analysis"), Mosca, August 22-27, 2011.

- "Infinite Dimensional Duality and the Elastic-Plastic Torsion Problem. Von Mises Functions", International Conference on Analysis and its Applications (ICAA 2011), Aligarh (India) November 19-22, 2011.

- "Regularity theory of the gradient for general nonlinear parabolic systems", International School "Variational and Geometric Methods in PDEs", Ancona, April 18-21, 2012.

- "On Linear and Nonlinear Elliptic Boundary Value Problems in the Plane with Discontinuous Coefficients", 58th Course on Variational Analysis and Applications of the International School of Mathematics "G. Stampacchia", Erice, May 14-22, 2012.

- "A survey on duality theory in elastic-plastic torsion problem", 9th AIMS Conference (Special Session: Variational Analysis and Equilibrium Problems), Orlando, Florida, July 1-6, 2012.

- "Variational approach for a general financial equilibrium problem. A path to the economy recovery", 43rd Annual Conference of the Italian Operational Research Society (Session on "Optima and Equilibria: Theory and Applications"), Vietri sul Mare, September 4-7 2012.

- "Global Hölder regularity for discontinuous elliptic equations in the plane", Workshop "Existence, Regularity and A Priori Bounds for Differential Problems", on the occasion of the 70th birthday of Prof. Mario Marino, Catania, May 2-3, 2013.

- "Infinite dimensional duality theory and elastic-plastic torsion problem", "11th EUROPT Workshop on Advances in Continuous Optimization", Firenze, June 26-28, 2013.

- "Variational Problems with gradient constraints", The Fourth International Conference on Continuous Optimization (ICCOPT 2013), Cluster "Complementarity and

Variational Inequalities", Organized Session “Variational inequalities and equilibrium problems II", Lisbon, July 28 - August 1, 2013.

- “Existence of Lagrange multipliers for the elastic-plastic variational inequality", 8th European Conference on Elliptic and Parabolic Problems, Minisymposium “Recent Advances in Variational Inequalities and their Applications", Gaeta, May 26-30, 2014.

- “Leggi empiriche della matematica", Miniconvegno “La Matematica: Presente e Futuro”, Catania, June 5, 2014.

- “Measure Type and L^p Lagrange Multipliers in Elastic-Plastic Torsion", 10th AIMS conference on Dynamical Systems, Differential Equations and Applications, Special Session “Variational methods for discrete and continuous boundary value problems (with applications)", Madrid, July 7-11, 2014.

- “Variational Approach for a General Financial Equilibrium Problem”, 3th Viennese Workshop on Optimal Control and Dynamic Games, Special Session “Variational Inequalities and Applications in Economics”, Vienna, May 13-16, 2015.

- “Measure Type and L^p Lagrange Multipliers in Elastic-Plastic Torsion", 63rd Course on Variational Analysis and Applications of the International School of Mathematics “G. Stampacchia”, Erice, August 28- September 5, 2015.

- “Radial solutions and free boundary of the Elastic-Plastic Torsion Problem", International Conference “Elliptic and Parabolic Problems", Minisymposium “Geometrical aspects of PDE’s and related questions", Gaeta, May 22-26, 2017.

- “Lagrange multipliers for the elastic-plastic torsion problem and strong duality", “Recent Advances in PDE’s", Napoli, July 12-14, 2017.

Publications

Papers

[1] S. Giuffrè, *The nonlinear oblique derivative problem in the plane*, C.R. Acad. Sci. Paris, **t. 325** Série I (1997), 1081-1086.

[2] S. Giuffrè, *Oblique derivative problem for nonlinear elliptic discontinuous operators in the plane*, Communications in Applied Analysis **2** no.4 (1998), 585-594.

[3] S. Giuffrè, *Oblique derivative problem for nonlinear elliptic discontinuous operators in the plane with quadratic growth*, C.R. Acad. Sci. Paris **t. 328** Série I (1999), 859-864.

[4] S. Giuffrè, *Well posedness of the tangential oblique derivative problem in the plane*, C.R. Acad. Sci. Paris **t. 331** Série I (2000), 207-212.

[5] S. Giuffrè, *On a planar emergent type oblique derivative problem*, C.R. Acad. Bulg. Sci. **55** no. 11 (2002), 11-16.

[6] S.Giuffrè, *Tangential oblique derivative problem in the plane with quadratic growth*, Communications on Applied Nonlinear Analysis, **10** no. 2 (2003), 41-54.

[7] S.Giuffrè, *On an oblique derivative problem of finite index for nonlinear elliptic discontinuous equations in the plane*, Publicationes Mathematicae Debrecen, **63** (4) (2003), 611-621 .

[8] S. Giuffrè, *Global Hölder regularity for discontinuous elliptic equations in the plane*, Proc. Amer. Math. Soc., **132** no. 5 (2004), 1333-1344.

[9] P.Daniele, S.Giuffrè and S.Pia, *Competitive Financial Equilibrium Problems with Policy Interventions*, Journal of Industrial and Management Optimization **1** (1) (2005), 39-52.

[10] S.Giuffrè, G.Idone and A.Maugeri, *Duality Theory and Optimality Conditions for Generalized Complementary Problems*, Nonlinear Analysis, **63** (2005), 1655-1664.

[11] S.Giuffrè, *Strong Solvability of Boundary Value Problems in Elasticity with Unilateral Constraints*, Applied Mathematics and Optimization, **51** (3) (2005), 361-372.

[12] S.Giuffrè, *On an estimate related to the Hessian and application to an oblique derivative problem*, Mathematical Inequalities and Applications, **8** (1) (2005), 111-127.

[13] S.Giuffrè and G.Idone, *Global regularity for solutions to Dirichlet problem for discontinuous elliptic systems with nonlinearity $q > 1$ and with natural growth*, Bollettino

Unione Matematica Italiana, (8) 8-B (2005), 519-524.

[14] S.Giuffrè and G.Idone, *Infinite Dimensional Lagrangean Theory and Applications to Generalized Complementarity Problems*, Le Matematiche, **LX** (II), (2005), 475-480.

[15] P.Daniele and S.Giuffrè, *General infinite dimensional duality and applications to evolutionary network equilibrium problems*, Optimization Letters **1** (2007), 227-243.

[16] S.Giuffrè, G.Idone, S.Pia, "Projected Dynamical Systems and Variational inequalities equivalence results", Journal of Nonlinear and Convex Analysis, **7** (3) (2006), 453-463.

[17] S.Giuffrè and G.Idone, *Global regularity for solutions to Dirichlet problem for discontinuous elliptic systems with nonlinearity $q > 1$ and with natural growth*, Journal of Global Optimization, 40 (1-3) (2008), 99-117.

[18] P. Daniele, S. Giuffrè, G. Idone, A. Maugeri, *Infinite Dimensional Duality and Applications*, Math. Annalen **339** (2007), 221-239.

[19] S.Giuffrè, G.Idone, S.Pia, *Some Classes of Projected Dynamical Systems in Banach Spaces and Variational inequalities equivalence results*, Journal of Global Optimization, 40 (1-3) (2008), 119-128.

[20] S.Giuffrè, S.Pia, *Weighted Traffic Equilibrium Problem in Non Pivot Hilbert Spaces*, Nonlinear Analysis: Theory, Methods & Applications 71 (12) 2054-2061 (2009).

[21] Daniele P, Giuffrè S., Maugeri A, Remarks on General Infinite Dimensional Duality with Cone and Equality Constraints, "Communications in Applied Analysis", 13 (2009) no.4, 567-578.

[22] S.Giuffrè, G.Idone, On Linear and Nonlinear Boundary Value Problems in the Plane with Discontinuous Coefficients, Discrete and Continuous Dynamical Systems - Series A (DCDS-A), vol. 31, no. 3, 2011.

[23] S.Giuffrè, G.Idone, A.Maugeri, Regularity theory of the gradient for general nonlinear parabolic systems, Applicable Analysis, vol. 91, p. 1847-1866, 2012.

[24] S.Giuffrè, A. Maugeri, New results on infinite dimensional duality in elastic-plastic torsion, Filomat, 26:5 (2012), 1029-1036.

[25] P. Daniele, S. Giuffrè, A. Maugeri, F.Raciti, Duality theory and aplications to unilateral problems, Journal of Optimization Theory and Applications, (2014) 162:718-

734 doi: 10.1007/s10957-013-0512-4.

[26] A.Barbagallo, P. Daniele, S. Giuffrè, A. Maugeri, Variational approach for a general financial equilibrium problem: the Deficit formula, the Balance law and the Liability formula. A path to the economy recover, European Journal of Operational Research, 237 (2014) 231-244. doi: 10.1016/j.ejor.2014.01.033.

[27] S.Giuffrè, A.Maugeri, A Measure-type Lagrange Multiplier for the Elastic-Plastic Torsion, Nonlinear Analysis, 102 (2014) 23-29. doi: 10.1016/j.na.2014.01.023.

[28] P. Daniele, S. Giuffrè, Random Variational Inequalities and the Random Traffic Equilibrium Problem, Journal of Optimization Theory and Applications 167 (1) (2015), 363-381.

[29] S.Giuffrè, A.Maugeri, D. Puglisi, Lagrange multipliers in elastic-plastic torsion problem for nonlinear monotone operators, Journal of Differential Equations, 259 (3) (2015), 817-837.

[30] P. Daniele, S. Giuffrè, C. Mirabella, Functional Inequalities, Regularity and Computation of the Deficit and Surplus Variables in the Financial Equilibrium Problem, Journal of Global Optimization, 65(3), pp. 575-596.

[31] S. Giuffrè, A. Pratelli, D. Puglisi, Radial solutions and free boundary of the elastic-plastic torsion problem, Journal of Convex Analysis 25 (2018)

[32] G. Colajanni, P. Daniele, S. Giuffrè, A. Nagurney, Cybersecurity Investments with Nonlinear Budget Constraints and Conservation Laws: Variational Equilibrium, Marginal Expected Utilities, and Lagrange Multipliers, to appear on International Transactions in Operational Research.

Book Chapters

[33] S. Giuffrè, *On the strong solvability of a unilateral boundary value problem for nonlinear discontinuous operators in the plane*, Equilibrium Problems: Nonsmooth Optimization and Variational Inequality Models, Kluwer Academic Publishers, Dordrecht, The Netherland, F. Giannessi - A. Maugeri - P. Pardalos Eds. (2001), 119-127.

[34] S.Giuffrè, *Strong solvability of boundary value problems in elasticity with unilateral*

constraints, Equilibrium Problems and Variational Models, Kluwer Academic Publishers, Dordrecht, The Netherland, P.Daniele, F.Giannessi - A.Maugeri Eds. (2002), 213-224.

[35] S.Giuffrè and S.Pia, *Variational Inequalities for time dependent financial equilibrium with price constraints*, Variational Analysis and Applications, F. Giannessi and A. Maugeri (eds.), Springer, 2005, 477-496.

[36] S.Giuffrè and G.Idone, *Global regularity for solutions to Dirichlet problem for elliptic systems with nonlinearity $q \geq 2$ and with natural growth*, Variational Analysis and Applications, F. Giannessi and A. Maugeri (eds.), Springer 2005, 451-463.

[37] S.Giuffrè, G.Idone and A.Maugeri, *Optimality Conditions for Generalized Complementarity Problems*, Variational Analysis and Applications, F. Giannessi and A. Maugeri (eds.), Springer, 2005, 465-475.

[38] Daniele P, Giuffrè S., Maugeri, S.Pia, (2010) A panoramic view on Projected Dynamical Systems, Nonlinear Analysis and Optimization, Springer Optim. Appl. vol. 35, p. 235-258, A.A. Khan, P.Pardalos, T.M.Rassias Editors, New York.

[39] S.Giuffrè, Elements of Duality Theory, Topics in Nonlinear Analysis and Optimization, Editor Q.H.Ansari, World Education 2012, Delhi, India, pp. 251–267.

[40] P. Daniele, S. Giuffrè, Maugeri, General traffic equilibrium problem with uncertainty and random variational inequalities. Optimization in science and engineering, 89-96, Springer, New York, 2014.

[41] P. Daniele, S. Giuffrè, M. Lorino, A Maugeri, C. Mirabella, Functional Inequalities and Analysis of Contagion in the Financial Networks, Handbook of Functional Equations - Functional Inequalities (Rassias, T. ed.), series Optimization and its applications, vol. 95, Springer, pp.129-146 (2014).

[42] G. Colajanni, P. Daniele, S. Giuffrè, A. Maugeri, Nonlinear Duality in Banach Spaces and Applications to Finance and Elasticity, Handbook of Nonlinear Analysis, Springer (to appear).

Proceedings

[43] S. Giuffrè, *Existence and uniqueness theorem for an oblique derivative problem*

for nonlinear elliptic discontinuous operators in the plane, 8th Int. Coll. on Differential Equations, D.Bainov (ed.) VSP, Utrecht, The Netherlands (1998), 187-193.

[44] S. Giuffrè, *Tangential oblique derivative problem for nonlinear elliptic discontinuous operators in the plane*, 9th Int. Coll. on Differential Equations, D.Bainov (ed.) VSP, Utrecht, The Netherlands (1999), 169-176.

[45] S.Giuffrè, S.Pia, *Wireless Communication Densities and User-Oriented Traffic Equilibrium Problem*, IEEE Conference Proceedings of the 4th International Conference on Wireless Communications, Networking and Mobile Computing, 2008 (Dalian, Cina, Ottobre 2008).

[46] S.Giuffrè, S.Pia (2010). Weighted Traffic Equilibrium Problem in Non Pivot Hilbert Spaces with Long Term Memory. In: AIP Conference Proceedings Rodi, September 2010, vol. 1281, p. 282-285.

[47] S.Giuffrè, A.Maugeri. Lagrange Multipliers in Elastic-Plastic Torsion, In: AIP Conference Proceedings Rodi, Vol. 1558, 2013, p. 1801-1804.

Research Interests

The main interests of her activity research are equilibrium problems (in particular elastic-plastic torsion problem, obstacle problem, Signorini problem, financial equilibrium problem, weighted traffic equilibrium problem, random traffic equilibrium problem), their formulation in terms of variational inequalities, their relationship with projected dynamical systems, infinite dimensional duality theory and boundary value problems for linear and nonlinear elliptic and parabolic systems with discontinuous coefficients.

In particular she obtained a new infinite dimensional duality theory, based on "Assumption (S)", that has led to definitive understanding of the existence of Lagrange multiplier elements in the difficult PDE setting of elastic-plastic torsion as well as in application to evolutionary network equilibrium problems ([15], [18], [21], [24], [25], [27], [29], [31], [42], [47]). The elements in question can be not only functions in L^∞, but also measures.

Through the use of Lagrange multipliers she contributed to the analysis of the behavior of the solutions to a variational inequality, which models equilibrium problems, (see [9], [26], [30], [35], [41] for financial equilibrium problem and [20], [28] [40], [45], [46] for traffic equilibrium problem).

Also, recently, she analyzed a cybersecurity investment supply chain game theory model with nonlinear budget constraints by means of Lagrange multipliers [42].

By means of the duality theory she also studied generalized complementarity problems, providing some optimality conditions ([10], [14], [34]).

She also dealt with projected dynamical systems, improving an equivalence result in the Hilbert spaces between critical points of these systems and equilibrium points of a variational inequality even to strictly convex and smooth Banach spaces and to a larger class of functions in Hilbert spaces ([16], [19], [35]).

As it concerns partial differential equations, she studied existence and regularity of strong solutions of boundary value problems for nonlinear discontinuous elliptic operators. In particular, she dealt with oblique derivative problem in the plane, proving solvability of problems with discontinuous coefficients, considering different cases of the oblique axis (neutral of emergent type), filling a gap in the literature, where there are not result for planar oblique derivative problem with discontinuous coefficients ([1], [2], [3], [4], [5], [6], [7], [12], [39], [40]).

Other studies were devoted to boundary value problem with contact unilateral boundary conditions. She proved an estimate for the second derivatives of the functions which satisfy the unilateral boundary conditions and the existence of strong solutions ([11], [30], [31]).

She established global Hölder regularity of the gradient in Lebesgue and Morrey spaces for planar elliptic discontinuous equations, estimating in an explicit way the Hölder exponent in terms of the eigenvalues of the operator ([8], [22]).

Moreover she studied regularity of weak solutions to a nonhomegeneous Dirichlet problem for elliptic discontinuous systems with nonlinearity $q > 1$ and quadratic growth, showing the sharp result that, without any kind of regularity assumptions on the coefficients,

the solutions are global Hölder continuous, for low values of the dimension ([13], [17], [33]).

Finally she dealt with partial Hölder regularity of the spatial gradient of weak solutions to a nonlinear parabolic system of second order in divergence form in the case of quadratic growth in the gradient ([23]).