Curriculum Vitae et Studiorum

Personal Data

Marina Pireddu

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Born on December 21st 1981 in Torino (TO)(Italy)
Italian Nationality

Current Position

04. 2022 – Associate Professor of Mathematical Methods of Economics, Finance and Actuarial Sciences (Sector STAT-04/A, ex SECS-S/06) at the University of Milano‑Bicocca.

Achieved on October 2nd 2022 the Italian National Academic Qualification as Full Professor for Sector 13/D4 (Mathematical Methods of Economics, Finance and Actuarial Sciences).

Past Positions

06. 2012 – 03. 2022 Assistant Professor of Mathematical Methods of Economics, Finance and Actuarial Sciences (Sector SECS-S/06) at the University of Milano‑Bicocca, tenured in June 2015.

07. 2009 – 06. 2011 Postdoctoral fellow at the Department of Mathematics for Decision Theory of the University of Florence.

Education

09. 2000 – 10. 2003 University of Udine,
Bachelor Degree in Mathematics (Laurea Triennale), graduated on October 9th 2003, summa cum laude (110/110 e lode). Dissertation title: *Poincaré-Miranda Theorem.* Advisor: Prof. F. Zanolin.

10. 2003 – 06. 2005 University of Udine,
Master Degree in Mathematics (Laurea Specialistica), graduated on June

30th 2005, summa cum laude (110/110 e lode). Dissertation title: *Topological degree, fixed-point theorems and chaotic-like systems*. Advisor: Prof. F. Zanolin.

01. 2006 – 12. 2008   University of Udine,
Doctoral Programme in Mathematics and Physics, successfully completed on June 4th 2009. Dissertation title: *Fixed points and chaotic dynamics for expansive-contractive maps in Euclidean spaces, with some applications*. Advisor: Prof. F. Zanolin.

08. 2011 – 05. 2012   European University Institute (EUI),
Doctoral Programme in Economics, completed the first year, obtaining the Degree of Master of Research (MRes) in Economics.

Fellowships and Prizes

10. 2000 – 09. 2003   Recipient of a grant from INdAM (Istituto Nazionale di Alta Matematica) for undergraduate students in Mathematics. Grant held along the whole Bachelor Degree (3 years).

07. 2005   Recipient of one of the 18 final prizes for the achievement of the Master Degree in Mathematics (Laurea Specialistica) for students holding a grant from INdAM.

01. 2006 – 12. 2008   Recipient of a PhD fellowship for the Programme in Mathematics and Physics at the University of Udine. Fellowship held along the whole PhD Programme (3 years).

07. 2009 – 06. 2011   Recipient of a one-year postdoctoral fellowship at the Department of Mathematics for Decision Theory of the University of Florence on *"Mathematical methods for Economics, Finance and Social Sciences"*, extended on July 2010 for a further year. Supervisor: Prof. M. Gori.

09. 2011 – 05. 2012   Recipient of a four-year PhD fellowship for the Programme in Economics at EUI. Fellowship held along the period of staying at EUI (9 months).

Grants   PRIN 2005 *"Ordinary Differential Equations and Applications"* (Principal Investigator Prof. F. Zanolin).

PRIN 2007 *"Ordinary Differential Equations and Applications"* (Principal Investigator Prof. F. Zanolin).

Recipient of the one-year individual grant for the ground research activities (FFABR 2018).

PRIN 2022 *"Evolutionary Poisson Games: Theory and Applications"* as Associated Investigator (Principal Investigator Prof. C. Meroni).

Other Duties

Referee for *Mathematical Reviews* and for the following Journals: *Abstract and Applied Analysis, Chaos, Solitons & Fractals, Communications in Nonlinear Science and Numerical Simulation, Decisions in Economics and Finance, Discrete Dynamics in Nature and Society, Economics Bullettin, International Journal of Bifurcation and Chaos, Journal of Difference Equations and Applications, Journal of Economic Dynamics and Control, Journal of Environmental Economics and Policy, Journal of Evolutionary Economics, Macroeconomic Dynamics, Mathematics and Computers in Simulation, Nonlinear Analysis, Physics Letters A.*

Organizer (with Prof. A. Naimzada) of the Workshop *"Teorie Matematiche della Crisi"* (*Mathematical Theories of the Financial Crisis*), held on February 6-7, 2014 at the University of Milano - Bicocca.

From 2014 to 2016 member of CISEPS (Center for Interdisciplinary Studies in Economics, Psychology and Social Sciences) Executive Board.

From April to August 2020 supervisor of the internship *"Analytical and numerical study of discrete-time economic models"* and from July to October 2020 supervisor of the thesis *"Analytical and numerical investigation of an evolutive model with real and financial interacting markets"*, student: Riccardo Mirmina, Bachelor Degree in Statistical and Economic Sciences, University of Milano - Bicocca.

From July to November 2021 supervisor of the thesis *"Chaotic dynamics in a system of coupled oscillators"*, student: Alessio Bosisio, Master Degree in Mathematics, University of Milano - Bicocca.

From November 2021 member of the committee of the PhD Programme in Economics, Management, and Quantitative Methods of the University of Sassari.

Co-organizer of the XII International Conference on Nonlinear Economic Dynamics (NED 2021), held in dual mode (in presence and online) on September 13–15, 2021 at the Catholic University of Sacred Hearth, Campus of Milan, including the joint session with the XLV AMASES Conference.

From September 2021 member of the Editorial Board of the Far East Journal of Dynamical Systems.

Co-organizer of the XLVII AMASES Conference, held on September 20–22, 2023 at the University of Milano - Bicocca.

From June 2024 supervisor of the research grant on the topic *"Evolutionary games and their applications to the study of socio-economic phenomena"*, with a duration of 18 months, funded by PRIN 2022. Grant holder: Dr. Paulo Medeiros.

Conference Attendance and Communications

08. 2003	Summer meeting with seminars organized by INdAM for grant holders in Perugia (Italy).
08. 2004 – 09. 2004	Summer School SMI in Perugia (Italy). Attended courses:

- *Functional Analysis*, G. Beer, University of Los Angeles, total amount of hours: 25+15.
- *Complex Analysis*, T. Suwa, University of Hokkaido, total amount of hours: 25+15.

08. 2005 – 09. 2005	Advanced School and Workshop on Singularities in Geometry and Topology at ICTP in Trieste.
19. 09 – 21. 09. 2005	Workshop on Dynamics in Torino.
26. 06 – 30. 06. 2006	School on Centers and Chaos in Finite Dimensional Dynamical Systems in Trento.
13. 08 – 19. 08. 2006	Xth Prague Topological Symposium in Prague (given a talk on *"Fixed points, periodic points and chaotic-like dynamics for contractive-expansive mappings"*).
22. 08 – 30. 08. 2006	International Congress of Mathematicians (ICM 2006) in Madrid (given a talk on *"Fixed points, periodic points and chaotic-like dynamics for contractive-expansive mappings"*).
13. 06 – 16. 06. 2007	International Conference on Topological Methods, Differential Equations and Dynamical Systems in Firenze (given a talk on *"Cutting surfaces and applications to fixed points and periodic points"*).
25. 06 – 28. 06. 2007	8th Colloquium on the Qualitative Theory of Differential Equations in Szeged (given a talk on *"Periodic points and chaotic-like dynamics: a topological approach"*).
27. 09 – 28. 09. 2007	Topics in Dynamical Systems in Udine (given a talk on *"A topological approach to chaotic-like dynamics with a connection to linked twist maps"*).
30. 06 – 18. 07. 2008	School and Workshop on Dynamical Systems at ICTP in Trieste.
10. 09 – 12. 09. 2008	Nonlinear Differential Equations (NODE 2008) in Brussels.
15. 12 – 17. 12. 2008	Workshop on Analysis and Numerics of Population Dynamics and Epidemics Models at CISM in Udine.
11. 06 – 13. 06. 2010	XIXth European Workshop on General Equilibrium Theory in Cracow (given a talk on *"Endogenous restricted participation in a financial market model with numeraire and real assets"*).

26. 06 – 01. 07. 2011   XIth Society for the Advancement of Economic Theory Conference (SAET 2011) in Ancao (given a talk on *"A simple model of restricted participation with real assets"*).

15. 09 – 17. 09. 2011   XXXV AMASES Conference in Pisa (given a talk on *"A simple model of restricted participation with real assets"*).

20. 09 – 22. 09. 2012   Dynamical Models in Economics and Finance (MDEF 2012) in Urbino (given a talk on *"Chaotic dynamics for expansive-contractive maps: a topological method and applications to Economics"*).

06. 02 – 07. 02. 2014   Teorie Matematiche della Crisi (Workshop on Mathematical Theories of the Financial Crisis), University of Milano - Bicocca (given a talk on *"Real and Financial Interacting Oscillators: a Behavioral Macro-Model with Animal Spirits"*).

18. 09 – 20. 09. 2014   Dynamical Models in Economics and Finance (MDEF 2014) in Urbino (given a talk on *"A financial market model with endogenous fundamental values through imitative behavior"*).

25. 06 – 27. 06. 2015   IX International Conference on Nonlinear Economic Dynamics (NED 2015) in Tokyo (given a talk on *"An evolutive financial market model: imitation and endogenous fundamental values"*).

07. 09 – 09. 09. 2017   X International Conference on Nonlinear Economic Dynamics (NED 2017) – I CICSE Workshop in Pisa (given a talk on *"Fashion cycle dynamics in a model with endogenous discrete evolution of heterogeneous preferences"*).

21. 05 – 25. 05. 2018   XXIV International Conference on Difference Equations and Applications (ICDEA 2018) in Dresden (given a talk on *"Complex dynamics in a class of discrete-time evolutionary general equilibrium models"*).

06. 09 – 08. 09. 2018   Dynamical Models in Economics and Finance (MDEF 2018) in Urbino (given a talk on *"Fashion cycle dynamics induced by agents' heterogeneity for generic bell-shaped attractiveness functions"*).

17. 12 – 18. 12. 2018   XX International Conference on Dynamical Systems and Differential Equations (ICDSDE 2018) in Barcelona (given a talk on *"Weak and strong coexistence among heterogeneous agents in two evolutionary continuous-time models"*).

09. 09 – 11. 09. 2019   XLIII AMASES Conference in Perugia (given a talk on *"Evolutionary selection of heterogeneous expectations with information costs in a Muthian cobweb model"*).

07. 07 – 09. 07. 2021   International Conference on Economic Modeling and Data Science (EcoMod 2021) in Milan, moved virtual (given a talk on *"Market sentiment and heterogeneous agents in an evolutive financial model"*).

26. 07 – 30. 07. 2021   XXVI International Conference on Difference Equations and Applica-

tions (ICDEA 2021) in Sarajevo, moved virtual (given a talk on *"Heterogeneous agents with adaptively adjusted beliefs about prices in an evolutive Muthian cobweb model"*).

13. 09 – 15. 09. 2021 XII International Conference on Nonlinear Economic Dynamics (NED 2021) in Milan (given a talk on *"An evolutive model with market sentiment"*, within the joint session with the XLV AMASES Conference).

18. 07 – 22. 07. 2022 XXVII International Conference on Difference Equations and Applications (ICDEA 2022) in Paris-Saclay, online participation (given a talk on *"A dynamic Cournot duopoly with differentiated goods and emission charges on output: linear and nonlinear formulations"*).

13. 06 – 16. 06. 2023 16th Chaos 2023 International Conference in Heraklion, Crete, online participation (given a talk on *"A topological proof of chaos via linked twist maps for two evolutionary game theoretic models"*).

20. 09 – 22. 09. 2023 XLVII AMASES Conference in Milan (given a talk on *"A proof of chaos for a seasonally perturbed version of Goodwin growth cycle model: linear and nonlinear formulations"*).

11. 06 – 14. 06. 2024 17th Chaos 2024 International Conference in Heraklion, Crete, online participation (given a talk on *"Proving chaos in a simple model of interdependent economies: a topological approach"*).

12. 09 – 14. 09. 2024 Dynamical Models in Economics and Finance (MDEF 2024) in Urbino (given a talk on *"Evolutionary entry games in oligopolies with differentiated goods"*).

Seminars and Public Engagement Activities

13. 12. 2006 Held a seminar on *"A topological approach to the study of periodic points and chaotic-like dynamics for functions defined on finite-dimensional spaces"* at the Department of Mathematics and Computer Science of the University of Udine.

29. 05. 2009 Held a seminar on *"Fixed points and chaotic-like dynamics for expansive-contractive maps in Euclidean spaces and some applications"* at the Department of Mathematics and Computer Science of the University of Udine.

02. 03. 2010 Held a seminar on *"Endogenous restricted participation in a financial market model with numeraire and real assets"* at the Department of Mathematics for Decision Theory of the University of Florence.

20. 04. 2012 Held a seminar on *"Restricted participation in General Equilibrium models"* at the Department of Quantitative Methods for Economic and Business Sciences of the University of Milano-Bicocca.

13. 09. 2012	Held a seminar on *"Chaotic dynamics for expansive-contractive maps: a topological method and some applications"* at the Department of Mathematics and Applications of the University of Milano-Bicocca.
10. 04. 2014	Held a seminar on *"Chaotic social interaction via endogenous reactivity: a simple topological proof"* at the Department of Mathematics and Applications of the University of Milano-Bicocca.
14. 05. 2020	Delivered a lecture on *"Mathematical models for the evolution of epidemics and populations"* within the Knowledge and Emergency Lecture Series, organized by the University of Milano-Bicocca. Video available at https://www.unimib.it/servizi/bicocca-orienta/saperi-che-orientano/ impatti-del-covid-livello-sanitario-sociale-economico-e-culturale

Teaching Activities

AY 2002/2003	Teaching assistant of Calculus I for undergraduate students in Computer Science at the University of Udine.
AY 2007/2008	Teaching assistant of Calculus I for undergraduate students in Civil Engineering at the University of Udine.
AY 2008/2009	Teaching assistant of Calculus II for undergraduate students in Electronic Engineering at the University of Udine.
From 2012 to 2014	Course of Basic Calculus for undergraduate students in Marketing, Business Communication and Global Markets (Li-Z), at the University of Milano-Bicocca; teaching assistant of Mathematics for Economics for graduate students in Economic Science at the University of Milano-Bicocca.
From 2015 to 2017	Course of Mathematics for undergraduate students in Organization Science (SCOR), at the University of Milano-Bicocca.
03. 2018	Minicourse (5 hours) on *"Financial models with interacting heterogeneous agents: modeling assumptions and mathematical tools from discrete dynamical system theory"* for the PhD Programme in Methods and Models for Economic Decisions at Insubria University.
From 2018 to 2021	Course of Calculus II for undergraduate students in Statistical and Economic Sciences, at the University of Milano-Bicocca; course (12 hours + 4 hours tutorials) *"Mathematics, Module I: Analysis in the Euclidean space"* for the PhD Programme in Economics and Finance of Catholic University of Sacred Hearth and for the PhD Programme in Economics and Statistics of the University of Milano-Bicocca.
09. 2019	Mathematical precourse for students in Biological Sciences and in Environmental Sciences and Technologies (taught the first half of the course).
AY 2019/2020	Course (24 hours, 4 ECTS) on *"Dynamic analysis of oligopoly models"* for the Economics Bachelor and Master Programmes of the University of

Graz. Delivered online due to the COVID-19 outbreak.

From 2021   Teaching assistant of Calculus for undergraduate students in Geological Sciences and Technologies at the University of Milano‑Bicocca (in relation to the second half of the course).

From 2022   Course of Basic Calculus for undergraduate students in Economics for Banks, Insurance and Financial Institutions (A-Lh), at the University of Milano‑Bicocca;
course of Basic Calculus for undergraduate students in Marketing, Business Communication and Global Markets (Li-Z), at the University of Milano‑Bicocca (taught the first half of the course);
teaching assistant of Linear Algebra and Geometry for undergraduate students in Computer Science (M-Z), at the University of Milano‑Bicocca.

Scientific Papers and Contributions

PUBLICATIONS:

M. Pireddu, F. Zanolin, Fixed points for dissipative-repulsive systems and topological dynamics of mappings defined on N-dimensional cells, *Advanced Nonlinear Studies* 5 (2005), 411–440.

M. Pireddu, F. Zanolin, Cutting surfaces and applications to periodic points and chaotic-like dynamics, *Topological Methods in Nonlinear Analysis* 30 (2007), 279–319.

M. Pireddu, F. Zanolin, Some remarks on fixed points for maps which are expansive along one direction, *Rendiconti dell'Istituto di Matematica dell'Università di Trieste* 39 (2007), 245–274.

A. Pascoletti, M. Pireddu, F. Zanolin, Multiple periodic solutions and complex dynamics for second order ODEs via linked twist maps, *Electronic Journal of Qualitative Theory of Differential Equations, Proc. 8'th Coll. Qualitative Theory of Diff. Equ.* 14 (2008), 1–32.

M. Pireddu, F. Zanolin, Chaotic dynamics in the Volterra predator-prey model via linked twist maps, *Opuscula Mathematica* 28/4 (2008), 567–592.

A. Medio, M. Pireddu, F. Zanolin, Chaotic dynamics for maps in one and two dimensions: a geometrical method and applications to economics, *International Journal of Bifurcation and Chaos in Applied Sciences and Engineering* 19 (2009), 3283–3309.

M. Pireddu, Period two implies chaos for a class of ODEs: a dynamical system approach, *Rendiconti dell'Istituto di Matematica dell'Università di Trieste* 41 (2009), 43–54.

M. Gori, M. Pireddu, A. Villanacci, Regularity and Pareto improving on

financial equilibria with price-dependent borrowing restrictions, *Research in Economics* 67 (2013), 100–110.

M. Pireddu, F. Zanolin, *Fixed Points, Periodic Points and Chaotic Dynamics for Continuous Maps with Applications to Population Dynamics.* In: Lotka-Volterra and Related Systems Recent Developments in Population Dynamics. De Gruyter Series in Mathematics and Life Sciences, vol. 2, pp. 123–234, De Gruyter, Berlin, 2013.

M. Gori, M. Pireddu, A. Villanacci, Existence of financial equilibria with endogenous short selling restrictions and real assets, *Decisions in Economics and Finance* 37 (2014), 349–371.

A. Naimzada, M. Pireddu, Dynamics in a nonlinear Keynesian good market model, *Chaos: An Interdisciplinary Journal of Nonlinear Science* 24, 013142 (2014), DOI: 10.1063/1.4870015

A. Naimzada, M. Pireddu, Chaotic social interaction via endogenous reactivity, *Journal of Difference Equations and Applications* 20 (2014), 1222–1239.

A. Naimzada, M. Pireddu, Adaptive decision dynamics: Bifurcations, multistability and chaos, *Applied Mathematics and Computation* 239 (2014), 375–390.

A. Naimzada, M. Pireddu, Dynamic behavior of product and stock markets with a varying degree of interaction, *Economic Modelling* 41 (2014), 191–197.

M. Pireddu, Chaotic dynamics in three dimensions: A topological proof for a triopoly game model, *Nonlinear Analysis: Real World Applications* 25 (2015), 79–95.

F. Cavalli, A. Naimzada, M. Pireddu, Effects of size, composition, and evolutionary pressure in heterogeneous Cournot oligopolies with best response decisional mechanisms, *Discrete Dynamics in Nature and Society* 2015 (2015), Article ID 273026, 17 pages.

A. Naimzada, M. Pireddu, Real and financial interacting markets: A behavioral macro-model, *Chaos, Solitons and Fractals* 77 (2015), 111–131.

F. Cavalli, A. Naimzada, M. Pireddu, Emergence of complex social behaviors from the canonical consumption model, *Mind & Society* (2015), DOI: 10.1007/s11299-015-0169-9

A. Naimzada, M. Pireddu, A financial market model with endogenous fundamental values through imitative behavior, *Chaos: An Interdisciplinary Journal of Nonlinear Science* 25, 073110 (2015), DOI: 10.1063/1.4926326

A. Naimzada, M. Pireddu, Introducing a price variation limiter mechanism into a behavioral financial market model, *Chaos: An Interdisciplinary*

Journal of Nonlinear Science 25, 083112 (2015), DOI: 10.1063/1.4927831

F. Cavalli, A. Naimzada, M. Pireddu, Heterogeneity and the (de)stabilizing role of rationality, *Chaos, Solitons and Fractals* 79 (2015), 226–244.

M. Hoelle, M. Pireddu, A. Villanacci, Incomplete financial markets with real assets and endogenous credit limits, *Journal of Economics* 117 (2016), 1–36.

F. Cavalli, A. Naimzada, M. Pireddu, A family of models for Schelling binary choices, *Physica A: Statistical Mechanics and its Applications* 444 (2016), 276–296.

A. Naimzada, M. Pireddu, Endogenous evolution of heterogeneous consumers preferences: multistability and coexistence between groups, *Economics Letters* 142 (2016), 22–26.

A. Naimzada, M. Pireddu, A positional game for an overlapping generation economy, *Journal of Difference Equations and Applications* 22 (2016), 1156–1166.

M. Pireddu, A topological proof of chaos for two nonlinear heterogeneous triopoly game models, *Chaos: An Interdisciplinary Journal of Nonlinear Science* 26, 083106 (2016), DOI: 10.1063/1.4960387

F. Cavalli, A. Naimzada, M. Pireddu, An evolutive financial market model with animal spirits: imitation and endogenous beliefs, *Journal of Evolutionary Economics* 27 (2017), 1007–1040.

A. Naimzada, M. Pireddu, Complex dynamics in an evolutionary general equilibrium model, *Discrete Dynamics in Nature and Society* 2018 (2018), Article ID 8471624, 13 pages (invited).

A. Naimzada, M. Pireddu, An evolutive discrete exchange economy model with heterogeneous preferences, *Chaos, Solitons and Fractals* 111 (2018), 35–43.

A. Naimzada, M. Pireddu, Fashion cycle dynamics in a model with endogenous discrete evolution of heterogeneous preferences, *Chaos: An Interdisciplinary Journal of Nonlinear Science* 28, 055907 (2018),
DOI: 10.1063/1.5024931

A. Naimzada, M. Pireddu, Strong coexistence for a model with endogenous evolution of heterogeneous agents, *Communications in Nonlinear Science and Numerical Simulation* 65 (2018), 35–53.

F. Cavalli, A. Naimzada, N. Pecora, M. Pireddu, Agents' beliefs and economic regimes polarization in interacting markets, *Chaos: An Interdisciplinary Journal of Nonlinear Science* 28, 055911 (2018),
DOI: 10.1063/1.5024370

A. Naimzada, M. Pireddu, Fashion cycle dynamics induced by agents' heterogeneity for generic bell-shaped attractiveness functions, *Journal of Difference Equations and Applications* 25 (2019), 942–968.

A. Naimzada, M. Pireddu, Eductive stability may not imply evolutionary stability in the presence of information costs, *Economics Letters* 186 (2020), 108513. Supplementary material related to this article available at https://doi.org/10.1016/j.econlet.2019.06.019

A. Naimzada, M. Pireddu, *Eductive Stability, Heterogeneous Information Costs and Period-Two Cycle Multiplicity.* In: F. Szidarovszky and G.I. Bischi (eds.) Games and Dynamics in Economics, pp. 125–141, Springer, Singapore, 2020.

A. Naimzada, M. Pireddu, A general equilibrium evolutionary model with two groups of agents, generating fashion cycle dynamics, *Decisions in Economics and Finance* 43 (2020), 155–185.

A. Naimzada, M. Pireddu, Rational expectations (may) lead to complex dynamics in a Muthian cobweb model with heterogeneous agents, *Journal of Economic Behavior & Organization* 177 (2020), 415–432.

M. Pireddu, Chaotic dynamics in the presence of medical malpractice litigation: A topological proof via linked twist maps for two evolutionary game theoretic contexts, *Journal of Mathematical Analysis and Applications* (2021), 125224.

F. Cavalli, A. Naimzada, N. Pecora, M. Pireddu, Market sentiment and heterogeneous agents in an evolutive financial model, *Journal of Evolutionary Economics* (2021), DOI: 10.1007/s00191-021-00737-4

A. Naimzada, M. Pireddu, Rational expectations and differentiated information costs for heterogeneous fundamentalists in an evolutive Muthian cobweb model, *Chaos: An Interdisciplinary Journal of Nonlinear Science* 32, 013128 (2022).

A. Naimzada, M. Pireddu, Adaptively adjusted beliefs about prices in an evolutive Muthian cobweb model, *International Journal of Bifurcation and Chaos in Applied Sciences and Engineering* 32 (2022), 2250137.

A. Naimzada, M. Pireddu, Differentiated goods in a dynamic Cournot duopoly with emission charges on output, *Decisions in Economics and Finance* 46 (2023), 305–318.

M. Pireddu, A proof of chaos for a seasonally perturbed version of Goodwin growth cycle model: linear and nonlinear formulations, *Axioms* 12 (2023), 344, Special Issue on Differential Equations in Applied Mathematics, DOI: 10.3390/axioms12040344 (invited)

A. Naimzada, M. Pireddu, Comparative dynamics analysis of the environmental policy efficacy in a nonlinear Cournot duopoly with differentiated

goods and emission charges, *Communications in Nonlinear Science and Numerical Simulation* 131 (2024), 107867.

A. Bosisio, A. Naimzada, M. Pireddu, Proving chaos for a system of coupled logistic maps: A topological approach, *Chaos: An Interdisciplinary Journal of Nonlinear Science* 34 (2024), 033112.

UNPUBLISHED WORKS:

M. Pireddu (2009), *Fixed points and chaotic dynamics for expansive-contractive maps in Euclidean spaces, with some applications.*
Ph.D. Thesis. Available at arXiv:0910.3832

M. Pireddu (2010), On expected and von Neumann-Morgenstern utility functions, mimeo, Università degli Studi di Firenze.
Available at arXiv:1010.4179

A. Naimzada, M. Pireddu (2019), The first fundamental theorem of welfare in a general equilibrium evolutionary setting. Available as: University of Milan Bicocca Department of Economics, Management and Statistics Working Paper No. 415.

F. Cavalli, P. Medeiros, A. Naimzada, M. Pireddu (2024), Evolutionary entry games in oligopolies with differentiated goods, work in progress.

F. Cavalli, A. Naimzada, M. Pireddu (2024), Free entry equilibria in a NPS pollution model with random profits, work in progress.

F. Cavalli, A. Naimzada, M. Pireddu, D. Visetti (2024), An epidemic evolutionary game with heterogeneous agents, work in progress.

Milan, September 27, 2024