Curriculum vitæ

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1 Education

- Laurea cum laude in Mathematics, University of Siena, 1988, thesis advisor Franco Montagna, thesis title *La logica modale predicativa della dimostrabilità*.
- Master in Mathematics, University of Toronto, 1990, thesis advisor Alasdair Urquhart, thesis title *The relative complexity of cut-free Gentzen systems and resolution*.
- Ph.D. in Mathematics, University of Siena, 1995, thesis advisor Daniele Mundici, thesis title *La logica infinito-valente di Łukasiewicz*.

2 Academic apointments

- 1995-2002. Tenured Assistant Professor, University of Udine.
- 2002-2021. Associate Professor, University of Udine.
- 2021-present. Full Professor, University of Udine.

3 Other

- Winner of a post-doc position in Mathematics, University of Pisa, 1995.
- 2001-02. Local coordinator of the Research Project *Logical, algorithmic, and algebraic methods for the treatment of uncertainty*, founded by the Italian Ministry for Education and Research (PRIN 2000).
- 2001-04. Secretary of the Italian Association for Logic and its Applications.

- 2003-04. Local coordinator of the Research Project *Proof-theory for many-valued logics. Modal logic and its extensions* (PRIN 2002).
- June-July 2005. Invited Professor, Université de Toulon et Var.
- 2005-06 Member of the Research Project *Many-valued logics and uncertain information* (PRIN 2004).
- 2006-07 Member of the Research Project *Ordinary differential equations* (PRIN 2005).
- 2008-10 Member of the Research Project *Ordinary differential equations* (PRIN 2007).
- 2011-13 Member of the Research Project *Equazioni differenziali ordinarie: sistemi dinamici, metodi topologici e applicazioni* (PRIN 2009).
- 2012. Enabled as full professor (I Fascia), group 01/A1.
- 2019-22 Member of the Research Project *Regular and stochastic behaviour in dynamical systems* (PRIN 2017)
- Referee for various journals, including Algebra Universalis, American Mathematical Monthly, Communications in Algebra, Discrete and Continuous Dynamical Systems, Fuzzy Sets and Systems, Journal of Pure and Applied Algebra, Journal of Symbolic Logic, Studia Logica, Archiv der Mathematik, Uniform Distribution Theory, Review of Symbolic Logic, Chaos, Solitons and Fractals, Journal of the London Math Soc., Theoretical Computer Science, Inventiones Mathematicæ.
- Reviewer for Zentralblatt MATH.

4 Courses taught at the University of Udine

- 1999-00, 2000-01. Category Theory.
- 2001-02, 2002-03. Discrete Mathematics, Galois Theory.
- 2003-04, 2004-05, 2005-06. Discrete Mathematics, Algebraic Dynamical Systems.
- 2006-07, 2007-08. Discrete Mathematics, Commutative Algebra.
- 2008-09, 2009-10. Arithmetic, Galois Theory.
- 2010-11. Arithmetic, Galois Theory, Advanced Galois Theory.
- 2011-12. Arithmetic, Galois Theory.
- 2012-13. Arithmetic, Commutative Algebra.

- 2013-14. Arithmetic, Mathematics and Statistics, Dynamical Systems.
- 2014-15. Arithmetic, Mathematics and Statistics, Holomorphic Dynamics.
- 2015-16. Arithmetic, Number Theory, Probability Theory.
- 2016-17. Arithmetic, Mathematical Logic, Probability Theory.
- 2017-18. Probability Theory, Complements of Mathematics, General Theory of Dynamical Systems.
- 2018-19, 2019-20, 2020-21. Mathematical Analysis, Probability Theory, General Theory of Dynamical Systems.

5 Research interests

I am interested in various structures that have their roots in logic and algebra, but exhibit interesting dynamical behaviour. I originally got involved in these structures through many-valued logics. In these logics the set of truth-values is extended to include more than the classical true-false, and this leads to considering various classes of algebras, which play the rôle of boolean algebras in the classical case.

It turns out that one can associate dual topological spaces to these algebras, obtaining a well behaved spectral theory. Since this association is functorial, endomorphisms of the algebras correspond to continuous selfmappings of the dual. The dynamical properties of the action have then natural counterparts at the algebraic and logical levels. The resulting dynamical systems are usually given by piecewise-fractional continuous transformations of the unit n-dimensional cube.

Such maps appear in various other settings, among others the theory of continued fractions, both classical and multidimensional, and as first-return maps of geodesic flows on hyperbolic manifolds. In recent years my main research interests centered around these topics.

6 Thesis supervision

- Raffaella Mulas, *Il principio di massima entropia*, tesi triennale, 110/110 e lode.
- Davide Ravotti, *Enumerazioni di Farey generalizzate*, tesi triennale, 110/110 e lode.
- Nikola Bogdanovic, *La distanza di Wasserstein tra probabilità sull'intervallo unitario*, tesi triennale, 110/110 e lode.
- Davide Ravotti, *Parametri di Misurewicz per la famiglia quadratica*, tesi magistrale, 110/110 e lode.

- Davide Sclosa, *The finiteness property for pairs of nonnegative unimodular integer matrices*, tesi magistrale, 110/110 e lode.
- Matteo Rigutto, *Algoritmi di approssimazione per probabilità proiettivamente stazionarie sull'intervallo* $[0, 1]$, tesi triennale.
- Alberto Cagnetta, *Quantum arithmetical chaos*, tesi magistrale, 110/110 e lode.

7 Workshop organization

- *On the joint spectral radius*, November 2019, Udine.
- *Around dynamical systems*, February 2018, Udine.
- *Mini-workshop on dynamical systems*, May 2015, Udine.

8 Recent invited conferences and seminars

- *Attractors of dual continued fractions.* Multidimensional Continued Fractions and Euclidean Dynamics, Lorentz Center, Leiden, July 2022.
- *Attractors of dual continued fractions.* Dynamical Systems @ Porto (online), October 2021.
- *Joint spectral radius: matrices, billiards and words.* Lowlands Dynamics Seminars (online), April 2021.
- *Slow continued fractions, Minkowski functions and the joint spectral radius.* Bremen-Oldenburg dynamics seminar (online), January 2021.
- *Billiards on pythagorean triples and their Minkowski functions.* Dynamical Systems and Beyond, March 2019, Pisa.
- *Continued fractions, transducers, and the Serret theorem.* Conference at Centro De Giorgi, March 2018, Pisa.
- *Continued fractions on triangle groups.* Giornate INDAM di Teoria dei Numeri, December 2017, Genova.
- *Moving rational points.* Autour de la fonction de Minkowski, March 2017, Grenoble.
- *Natural extension of continued fractions (in the natural way).* March 2016, University of Bristol.
- *Dynamical aspects of algebraic logic.* School and Conference on Dynamical Systems, August 2015, ICTP Trieste.

- *Ergodic and equidistribution issues in algebraic logic.* Scuola AILA di Logica, August 2014, Gargnano.
- *Equidistribution in algebraic logic.* Conference at Centro De Giorgi, May 2014, Pisa.
- *Falsity, measures, and repelling assignments.* Naples-Konstanz Model Theory Days, November 2013, Caserta.

9 Publications

[1] G. Panti. Attractors of dual continued fractions. *J. Number Theory*, 240:50–73, 2022.

[2] G. Panti and D. Sclosa. The finiteness conjecture holds in $(\mathrm{SL}_2\mathbb{Z}_{\geq 0})^2$. *Nonlinearity*, 34(8):5234–5260, 2021.

[3] G. Panti. Billiards on pythagorean triples and their Minkowski functions. *Discrete Contin. Dyn. Syst.*, 40(7):4341–4378, 2020.

[4] G. Panti. Decreasing height along continued fractions. *Ergodic Theory Dynam. Systems*, 40(3):763–788, 2020.

[5] G. Panti. Slow continued fractions, transducers, and the Serret theorem. *J. Number Theory*, 185:121–143, 2018.

[6] G. Panti. The weighted Farey sequence and a sliding section for the horocycle flow. http://arxiv.org/abs/1503.02539, 2015.

[7] G. Panti and D. Ravotti. Measures induced by units. *J. Symbolic Logic*, 78(3):886–910, 2013.

[8] G. Panti. Denominator-preserving maps. *Aequationes Math.*, 84(1-2):13–25, 2012.

[9] G. Panti. Kakutani-von Neumann maps on simplexes. *Acta Arith.*, 148(4):333–350, 2011.

[10] G. Panti. A general Lagrange theorem. *Amer. Math. Monthly*, 116(1):70–74, 2009.

[11] G. Panti. Multidimensional continued fractions and a Minkowski function. *Monatshefte für Mathematik*, 154:247–264, 2008.

[12] G. Panti. The automorphism group of falsum-free product logic. In S. Aguzzoli et al., editor, *Algebraic and Proof-theoretic Aspects of Non-classical Logics*, number 4460 in Lecture Notes in Artificial Intelligence, pages 275–289. Springer, 2007.

[13] G. Panti. Invariant measures in free MV-algebras. *Comm. Algebra*, 36(8):2849–2861, 2008.

[14] G. Panti. Bernoulli automorphisms of finitely generated free MV-algebras. *J. Pure Appl. Algebra*, 208(3):941–950, 2007.

[15] G. Panti. Dynamical properties of logical substitutions. *Discrete Contin. Dyn. Syst.*, 15(1):237–258, 2006.

[16] G. Panti. Generic substitutions. *J. Symbolic Logic*, 70(1):61–83, 2005.

[17] P. Aglianò and G. Panti. Geometrical methods in Wajsberg hoops. *J. of Algebra*, 256:352–374, 2002.

[18] F. Montagna and G. Panti. Adding structure to MV-algebras. *J. Pure Appl. Algebra*, 164(3):365–387, 2001.

[19] D. Mundici and G. Panti. Decidable and undecidable prime theories in infinite-valued logic. *Ann. Pure Appl. Logic*, 108(1-3):269–278, 2001.

[20] G. Panti. Prime ideals in free ℓ-groups and free vector lattices. *J. of Algebra*, 219(1):173–200, 1999.

[21] D. Mundici and G. Panti. A constructive proof that every 3-generated ℓ-group is ultrasimplicial. In D. Niwinski et al., editor, *Logic, Algebra, and Computer Science. Helena Rasiowa in Memoriam*, number 46 in Banach Centre Publications Series. Polish Academic Publishers, 1999.

[22] G. Panti. Varieties of MV-algebras. *J. of Applied Non-Classical Logics*, 9(1):141–157, 1999.

[23] D. Mundici and G. Panti. Twenty questions with many-valued answers. In X. Caicedo and C. Montenegro, editors, *Models, Algebras, and Proofs*, number 203 in Lecture Notes in Pure and Applied Mathematics, pages 295–313. Dekker, 1999.

[24] A. Di Nola, R. Grigolia, and G. Panti. Finitely generated free MV-algebras and their automorphism groups. *Studia Logica*, 61(1):65–78, 1998.

[25] G. Panti. Multi-valued logic. In D. Gabbay and P. Smets, editors, *Quantified Representation of Uncertainty*, number 1 in Handbook of Defensible Reasoning and Uncertainty Management Systems, pages 25–74. Kluwer, 1998.

[26] G. Panti. A geometric proof of the completeness of the Łukasiewicz calculus. *J. of Symbolic Logic*, 60(2):563–578, 1995.

[27] D. Mundici and G. Panti. Extending addition in Elliott's local semigroup. *J. of Functional Analysis*, 117(2):461–472, 1993.

[28] G. Panti. The logic of partially ordered abelian groups with strong unit. In G. Gerla, editor, *Atti del XV Incontro di Logica Matematica*, pages 85–107. 1992. Available from the author's home page.

[29] G. Panti. Solution of a number theoretic problem involving knowledge. *International J. of Foundat. Comp. Sci.*, 2:419–424, 1991.