CURRICULUM VITÆ ET STUDIORUM OF LUIGI C. BERSELLI

Education

November 1991-October 1995, after written and oral admission examinations (Mathematics and Physics), **full-grant student position** in the class of SCIENCE at the Scuola Normale Superiore of Pisa, Italy.

January 1994, **visiting research student** at the École Normale Supérieure of Paris, France.

July 13, 1995, **degree (Laurea) in Mathematics**, University of Pisa/Scuola Normale Superiore, with mark 110/110 *cum laude*, defending the research dissertation of mathematical analysis: *On the global existence for the solutions to the equations of ideal fluids* (Italian), directed by Prof. H. Beirão da Veiga, and co-directed by Prof. S. Spagnolo. This thesis has been awarded with the prize from the "*Accademia Olimpica*" of Vicenza, May 1997.

November 1995–October 1999, after being the 1st classified in the written and oral entrance examinations, **Ph.D. student in Mathematics** at the Dept. of Mathematics "L. Tonelli", University of Pisa. During the four years of the school, I spent some time (about one year) visiting the Dept. of Mathematics of the University of Trento, Italy.

July 11, 1997, **Ms. in Mathematics**, Scuola Normale Superiore di Pisa, with mark 70/70 *cum laude*, defending original results on the subject *Numerical methods for the PDEs of Mathematical Physics*.

February 28, 2000, **Ph.D. in Mathematics** defending (with an international committee) the thesis: *Some topics in fluid mechanics*, with Proff. Hugo Beirão da Veiga (Pisa) and Alberto Valli (Trento) as advisors.

Positions and titles

December 2015-present, **Full Professor of Mathematical Analysis (MATH-03/A)**, University of Pisa.

December 2013, **National Scientific Qualification (Habilitation), Full Professor of Mathematical Analysis.**

October 2006-November 2015, **Associate Professor of Mathematical Analysis**, University of Pisa.

March 2000-September 2006, permanent research and teaching position of **Assistant Professor of Mathematical Analysis**, University of Pisa.

November 1999–February 2000, post-doc under the project: *"Mathematical models in engineering and industry: theoretical and computational tools,"* University of Pisa.

Professional Societies

- American Mathematical Society (AMS)
- Italian National Institute for Higher Mathematics (INdAM/GNAMPA)

Research interests

- Navier-Stokes equations, theory of existence and regularity for weak solutions.
- Mathematical foundations of analytical methods for Large Eddy Simulation of turbulent flows.
- Applications of Mathematical Analysis to bio-fluids and to geophysical flows.
- Numerical treatment and approximate models for large scale flows.
- Non-Newtonian fluids with shear dependent viscosities.

Bibliometric indicators

- Scopus: Documents: 104; citations: 1405; h-index: 19, SC: 6602770666
- Web of Science: Documents: 118; citations: 1671, h-index: 21 I-4763-2012
- Mathematical Reviews: Documents: 113, citations: 1460, h-index: 18, MR636037
- zbMATH: Documents: 117, citations: 1358, h-index: 17, berselli.luigi-carlo
- Google Scholar: Documents: 120, citations: 2936, h-index: 26; Profile
- ORCiD: 0000-0001-6208-9934l

Participation to and coordination of National Research projects

- PRIN 2000, Theory and applications of linear and nonlinear hyperbolic equations, national coordinator S. Spagnolo.
- PRIN 2002, Hyperbolic and parabolic nonlinear equations, national coordinator P. Marcati.
- PRIN 2005, Fluid dynamics and conservation laws, national coordinator P. Secchi.
- PRIN 2007, Nonlinear systems of conservation laws and fluid mechanics, national coordinator S. Bianchini.
- PRIN 2009, Systems of conservation laws and fluid mechanics: method and applications, national coordinator S. Bianchini.
- PRIN 2012, Nonlinear hyperbolic partial differential equations, dispersive and transport equations: theoretical and applicative aspects, national coordinator S. Bianchini.

- PRIN 2016 Hyperbolic systems of conservation laws and fluid dynamics: analysis and applications, national coordinator S. Bianchini.

- PRIN 2020 Nonlinear evolution PDEs, fluid dynamics and transport equations: theoretical foundations and applications, coordinator of the unit in Pisa.

- GNAMPA 2007, Random and computational models for the analysis of turbulence generated by rough walls, national coordinator M. Romito

- GNAMPA 2011, Continuous and discrete statistical models for the study of the transport of the kinetic energy in ideal fluids, national coordinator.

- GNAMPA 2012, Analysis of trajectories of solutions of stochastic partial differential equations, national coordinator M. Romito.

- GNAMPA 2017, Stability, continuation and turbulence in evolution problems, national coordinator.

- GNAMPA 2023, Analytical and numerical studies for systems of partial differential equations, coordinator A. Abbatiello.

- PRA_2016_6 UNIPI: Evolution problems: qualitative analysis and asymptotic behavior, coordinator N. Visciglia.

- PRA_2018_52 UNIPI: Energy and regularity: New techniques for classical PDE problems, coordinator E. Chiodaroli.

Editorial services

Editor

- Advances in Mathematical Physics, Hindawi [2008-present]

- Guest editor for the special volume *Fluid Dynamics and Electromagnetism: "Theory and Numerical Approximation"* of the journal Discrete Contin. Dynam. Systems Series S. **9** 2016 doi:10.3934/dcdss.2016.9.1i

- Boundary Value Problems, Springer [2016-present]

- Advances in Nonlinear Analysis, De Gruyter [2019-2025]

- Co-Editor of the volume *Progress in Fluid Mechanics*, Lecture Notes in Mathematics 2272, 2020, ISBN 978-3-030-54898-8 doi:10.1007/978-3-030-54899-5

- Zeitschrift für angewandte Mathematik und Physik (ZAMP), Birkhäuser [2022-present]

- Differential and integral equations [2025-]

Reviewer

- I reviewed about 250 paper for international mathematical journals, obtaining also the certificate of excellence by Elsevier in 2014.
- Reviewer for the Mathematical Reviews (2002-present, 200 reviews).

Other services

Administrative services

Elected member of the internal committee that evaluates the research activity and research grants in: "Mathematics, Applied Mathematics, and Computer Sciences," for the whole University of Pisa. [2002-2004], [2014-2018].

Elected member of the executive committee for the Ph.D. school in Mathematics, University of Pisa. [November 1, 2006-January 31, 2012], [March 1, 2023-present]

Elected member of the executive committee for the Ph.D. School in High Performance Scientific Computing [May 1, 2025-present]

Elected member of the executive committee of the Dean of the faculty of Engineering, University of Pisa. [July 1, 2009-Sep 18, 2012.]

Elected member of the Department Joint Committee [Nov. 1, 2016-2021]

Department delegate for Research. [May 2017-present]

Member of the Scientific Committee of the CIME Foundation (Florence) [Gen. 1, 2020-present]

Italian spoke-person for the DFG funded International Research Training Group 3132 - Analysis of Nonlinear PDE [Oct 2025-present]

Outside ex-valuator

- U.S. Universities (2006 & 2018)
- U.K. Universities (2014)
- Portugal Universities (2023)
- MIUR (FIRB 2013) and (SIR 2015)
- (ANEP)-Agencia Nacional de Evaluación y Prospectiva, Spain (2015)
- National Science Centre Poland (2019)
- ERC (2020)
- The Czech Science Foundation-GACR (2020)

Organization of conferences/schools

- Co-organizer of the workshop: "Partial Differential equations, fluid mechanics and conservation laws," Pisa, November 28-30, 2007.
- Organizer of the mini-symposium: "Navier-Stokes equations and LES models", within the conference MFD2010 (Mathematical fluid dynamics and its applications) Rennes (France, June 21–24, 2010).
- Co-organizer of the workshop: "Fluid Dynamics and Electromagnetism: Theory and Numerical Approximation," CIRM-FBK, Levico Terme, June 3-6, 2014.
- Co-organizer of the workshop: "New trends in Partial Differential Equations", Centro De Giorgi, Pisa, October 3–7, 2016.
- Co-organizer of the workshop: "Recent Progresses in PDEs" Dep. Mathematics, University of Pisa, January, 19-20th, 2017.
- Co-organizer of the workshop: "Equazioni alle Derivate Parziali nella Dinamica dei Fluidi" Centro De Giorgi, Pisa, February, 5–7th, 2018.
- Co-organizer of the workshop: "Variational problems, PDEs and applications", Dept. Mathematics, University of Pisa, January, 17-19th, 2019.
- Co-organizer of the CIME summer school: "Progress in Mathematical Fluid Dynamics" Cetraro (CS), June 17–21th, 2019.
- Co-organizer of the workshop: "Variational problems, PDEs and applications", Dep. Mathematics, University of Pisa, January, 17-18th, 2020.
- Co-organizer of the workshop: "Analysis of nonlinear, PDEs", Dep. Mathematics, University of Pisa, June, 6-7th, 2024.

Member of the admission committee for the Ph.D. in Applied and Industrial Mathematics, 2002, 2003, 2008, & 2009, Scuola Normale Superiore, Pisa.

Member of the committee for midterm examination of Ph.D. students in Mathematics, University of Pisa, 2008.

Member of the admission committee for the Ph.D. in Industrial Engineering, 2009 & 2011, University of Pisa.

Member of the admission committee for the Ph.D. in Mathematics, 2021, University of Pisa.

Member of the committee Full grant student for the class of science , 2025, Scuola Normale Superiore, Pisa.

Member of the hiring committee for: a) research contract in Mathematical Analysis, 2002, 2007, 2022, 2023, & 2024 (Univ. of Pisa); b) Researcher in Mathematical Analysis, 2016 & 2021 (Univ. of Pisa); c) Full professor in Probability 2017 (Univ. of Pisa); d) Tenure track associate professor in Mathematical Analysis, 2017 (GSSI, L'Aquila), 2018 (Univ. of Pisa), 2024 (GSSI, L'Aquila); c) Full professor in Mathematical Analysis 2023 (Univ. of Brescia)

Member of the hiring committee promotion of tenure track associate Prof. in Mathematical Analysis, 2021 & 2025 (two times)

Member of the jury for Ph.D. final examinations for

- Enrica Salvatici, Ph.D. in Aerospace Engineering, University of Pisa, September 2005.
- Luis Borges, Ph.D. in Mathematics, Instituto Superior Técnico, Lisbon, December 2006.
- Jmmy Alfonso Mauro, Ph.D. in Mathematics, University of Pisa, January 2010.
- Angel Castro Martínez, Ph.D. in Mathematics, Universidade Autónoma de Madrid, July 2010
- Hani Ali, Ph.D. in Mathematics, University Rennes 1, Rennes (France), December 2011, referee.
- Monica Twarogowska, Ph.D. in Mathematics, University of L'Aquila, February 2012.
- M. Ahmed Rejaiba, Ph.D. in Mathematics, University of Pau et des Pays de l'Adour (France), December 2014.
- Elena Di Iorio, Ph.D. in Mathematics, SISSA (Trieste) and GSSI (L'Aquila), October 2018.
- Giada Cianfarani Carnevale, Ph.D. in Mathematics, University of L'Aquila, July 2022.

Graduate students

- Stefano Spirito, "The artificial compressibility approximation and the inviscid limit for the incompressible Navier-Stokes equations," PhD from the University of L'Aquila, thesis defended in February 2012. (Currently associate professor at the Univ. of L'Aquila)
- Matteo Cerminara, "Modeling dispersed gas-particle turbulence in volcanic ash plumes," PhD from the Scuola Normale Superiore (Pisa), thesis defended in July 2016. (Currently permanent researcher at the INGV, National Institute of Geophysics and Volcanology).
- Dinh Duong Nguyen, "Some results about turbulent models," PhD. from Rennes Univ. 1 (France), thesis defended in Oct. 1, 2020. (Currently research associate at Vietnam Institute for Advanced Study in Mathematics (VIASM), Hanoi, Vietnam)

Undergraduate students .

Bachelor students (third year)

- Matteo Ballero, Introduction to the wavelet transform (2016)
- Eric Stenhede, Curves with constant width described by Fourier Series (2017)
- Ginvevra Biondi, Sobolev integral formula and applications (2017)
- Martino Fortuna, The Schwarz alternating method (2017)
- Matteo Aldovardi, On the implicit function theorem (2018)
- Sean Berti, On the Polya function (2018)
- Marco Miani, From the Calderón problem to the Harry Potter's cloak (2018)

Master Students (fifth year)

- Arturo Battinelli, "On the analysis of a probabilistic model for viscous flows in channels with rough walls" (Probability and Analysis, in Italian) University of Florence (2008), mark 110/110 *cum laude* (co-advisor with M. Romito)

- Alice Borselli, Existence and uniqueness of very-weak solutions for generalized Stokes systems (Analysis, in Italian) University of Pisa (2009), mark 110/110 (co-advisor with M. Romito).

- Michele Erba, Mathematical models for the wind flow over a hill and applications to aeolian factories collocation. (Applied Mathematics) (2010), mark 107/110 (co-advisor with Dr. Eng. P. di Marco).

- Nicolas Orsini, Equations de Navier-Stokes et modélisation de la turbulence (2019), Stage ENS Cachan.

- Nicola Mazur, Evolution problems: a non Archimedean approach (Non standard analysis and PDEs) (2025), mark 110/110 *cum laude* (co-advisor with V. Benci).

Post doc mentoring

- Luca Bisconti, Dept. of Appl. Math, University of Florence, 2009-2011 (Currently associate professor at the Univ. of Florence).

- Rossano Sannipoli, Dept. of Math, University of Pisa, June 2023-May 2024. (Currently post-doc at the Univ. of Padova).

- Alex Kaltenbach, Dept. of Math, TU Berlin, June 2023-March 2024 (Currently post-doc at TU Berlin).

Courses Taught

FOR UNDERGRADUATE STUDENTS:

- Support teaching activity of **Mathematics I** (Calculus I), 1999-2000 Univ. of Trento; 2000-2004, Univ. of Pisa, Faculty of Engineering.

- Support teaching activity of **Mathematical Analysis III** (Fourier series and transform, stability for system of ODEs, function of one complex variable), 2000-2001 Univ. of Pisa, Faculty of Engineering.

- **Introductory mathematics for engineers** (pre-calculus), 2002-2007 Univ. of Pisa.

- **Mathematics** (Calculus I and Linear Algebra), 2004-2008 Univ. of Pisa, Faculty of Engineering.

- **Introduction to automata theory**, Honor class, 2005-2006, Univ. of Pisa, Faculty of Engineering.

- **Mathematical Analysis I** (Calculus I), 2008–present, Univ. of Pisa, Computer Science Engineering.

- **Mathematical Analysis II** (Calculus II), 2021–2022, Univ. of Pisa, Computer Science Engineering.

- **Semigroup theory**, 2012-2013, Univ. of Pisa, School of Mathematics.

- **Mathematical Analysis III** (Fourier series and transform and applications to partial differential equations, basic of Hilbert spaces, surface integrals and Stokes theorem) 2014–2018, Univ. of Pisa, School of Mathematics.

- **Equations of Mathematical Fluid Mechanics**, 2020–22, 2023-24, Univ. of Pisa, School of Mathematics.

FOR GRADUATE STUDENTS:

- **Domain Decomposition Methods for PDE's**, Ph.D. in Applied and Industrial Mathematics, 2001-2002 Scuola Normale Superiore, Pisa.

- Lectures on the **Navier-Stokes theory**, 2002-2003 University of Pisa.

- **Introduction to the LES of turbulent flows** for MS. students, 2005-2006, IST (Instituto Superior Técnico) Lisbon.

- **An introduction to the mathematics of Large Eddy Simulation of turbulent flows** SIMUMAT summer school 2008, CIEM (International Center of Mathematical meetings), Castro Urdiales, Cantabria, Spain, July 7-18, 2008.

- **Introduction to PDE** for Ph.D. students, '08-'09 University of Pisa, Faculty of Engineering.

- **Introduction to mathematics of Large Eddy Simulation of turbulent flows**, Ph.D. program in industrial mathematics 2008-2011, Scuola Normale Superiore, Pisa.

- **On the Stokes Problem with Navier Boundary Conditions**, September 2009, SISSA/ISAS (International School for Advanced Studies), Trieste.

- **Some Selected Topics in Incompressible Fluid Mechanics** Summer School 2011 (Analytic Methods in PDEs), Department of Mathematics, University of Surrey, UK, September 12-16, 2011

- **Mathematical fluid dynamics**, Master-PhD class, KAUST, Saudi Arabia, Jan-May, 2023,

Research periods in foreign institutions

i) Pittsburgh University, Department of Mechanical Engineering, September 26–October 3, 2000, Pittsburgh (PA, U.S.)

ii) Pittsburgh University, Department of Mechanical Engineering and Department of Mathematics, March 23–April 12, 2001, Pittsburgh (PA, U.S.)

iii) Instituto Superior Técnico, Departamento de Matemática, April 16–25, 2002, Lisbon, (Portugal).

iv) Pittsburgh University, Department of Mechanical Engineering and Department of Mathematics, February 1-28, 2003, Pittsburgh (PA, U.S).

vi) Otto-von-Guericke-Universität, Institut für Analysis and Numerik, May 8-15, 2004, Magdeburg (Germany).

vii) Albert-Ludwigs Universität, Abteilung für Angewandte Mathematik, May 9–28 and August 20–September 13, 2005, Freiburg (Germany)

viii) Universidade de Lisboa, Centro de Matemàtica e Aplicações Fundamentais and Instituto Superior Técnico, March 20–April 7, 2006, Lisboa (Portugal).

vii) Albert-Ludwigs Universität, Abteilung für Angewandte Mathematik, March 3–15, 2008, Freiburg (Germany).

viii) Virginia Tech, Department of Mathematics, March 29–April 3, 2009, Blacksburg (VA, U.S.).

ix) American Institute of Mathematics, Palo Alto (CA, U.S.) April 6–10, 2009

x) University Rennes 1, UFR Mathématiques, May 18–29, 2009, Rennes (France).

xi) Instituto de Ciencia Matemáticas, Nov 21–27, 2010, Madrid (Spain).

xii) Albert-Ludwigs Universität, Abteilung für Angewandte Mathematik, March 15–26, 2013, Freiburg (Germany).

xiii) Albert-Ludwigs Universität, Abteilung für Angewandte Mathematik, Erasmus professor July 1–5, 2018, Freiburg (Germany).

xiv) Computer, Electrical and Mathematical Sci. and Eng. Dept., King Abdullah University of Science and Technology KAUST, visiting professor, Jan-May, 2023, Thuwal (Saudi Arabia).

Invited talks (organized by year)

1995

- Conference *Equadiff95* (Dep. de Matemática, Faculdade de Ciências, Lisbon, July 24–29, 1995). Talk: "On the breakdown of the smooth solutions to the Euler equations."

1997

- Conference *Modeling of smart materials and optimal shape design* (Pisa, Dip. di Matematica "L. Tonelli," April 17–18, 1997). Talk: "On electro-viscous fluids."

1998

- Conference *Delft meeting on functional analysis and nonlinear partial differential equations* (Delft, Technical University TUDelft, The Netherlands, May 23–28, 1998). Talk: "A remark on 3-D Navier-Stokes equations."

- Conference *Deterministic and stochastic fluid mechanics* (Torino, Dept. of Math., September 10–11, 1998). Talk on: "Some results on the long-time behavior of Navier-Stokes equations."

1999

- Conference *IPERRoma99* (Roma, C.N.R.-National Research Council, October 25–27, 1999). Talk: "2D quasi-geostrophic equation, 3D Euler equations and related questions."

2001

- Dip. di Matematica, Università di Milano, *Applied Math Seminar* (February 2001), Talk: "New results regarding the Navier-Stokes equations"

- Dept. of Mech. Eng., Pittsburgh University, U.S.A. (February 2001), a couple of 1 hour-seminars on: "Mathematical modeling of turbulent flows."

- Dept. of Math., Pittsburgh University U.S.A., *Applied Math Seminar* (March 2001), Talk: "Numerical methods for advection-diffusion equations."

- Conference *Contemporary Challenges in Applied Fluid Mechanics*, (Capo Miseno, May 31–June 5, 2001). Talk: "On the existence of strong solutions for a Large Eddy Simulation model."

- Dept. of Aerospace Eng., Università di Pisa (July 2001), Talk: "Problems and methods in Large Eddy Simulation."

- Conference *Nonlinear hyperbolic equations, their applications to hydrodynamics, dynamical systems*, (Torino, October 1–4, 2001). Talk: "The role of the vorticity field for incompressible flows."

2002

- Dept. of Pure and Appl. Math., Università di L'Aquila (March 2002), Talk: "Analytical and geometric results for the Navier-Stokes equations."
- *Workshop on Hyperbolic Equations*, (Venezia, April 11–12, 2002). Talk: "On the Euler equations and the motion of a vortex filament."
- Conference *AMIF 2002-Applied Math for Industrial Flows, Third International Conference (April 17-20, 2002 Lisbon-Portugal).* Talk: "Some Analytical results regarding the Rational Large Eddy Simulation model."
- Dep. de Matemática, Instituto Superior Técnico, *Seminar on Applied Math and Numerical Analysis* (April 2002), Talk: "On the filtration through porous media: G-convergence and domain decomposition methods."
- Conference *Advances on Nonlinear PDEs*, (June 5-8, 2002 L'Aquila). Talk: "Space filtered Navier-Stokes equations for turbulent flows: mathematical modeling and analytical results."
- Dept. of Math. MOX-Politecnico di Milano (June 2002), Talk: "On the evolution of the vorticity in turbulent flows and small scale structures"

2003

- Dept. of Math, Pittsburgh University U.S.A., Applied Math- Seminar (February 2003), Talk: "Domain decomposition methods for the coupling of the Stokes equations and the porous media equations"
- Dept. of Math, Pittsburgh University U.S.A., Weekly Colloquium (February 2003), "New results and open problems in the mathematical theory of viscous incompressible flows." Colloquium.
- Dept. of Math, Pittsburgh University U.S.A., Computational Math Seminar (February's 2003), Talk:"On the slip with linear friction boundary conditions for the Navier-Stokes equations."
- Dept. of Mechanical Engineering, Pittsburgh University U.S.A., FFF Fluid Mechanics Seminar (February 2003), Talk: "Some results for the Rational Large Eddy Simulation Model"
- Dept. of Math, Virginia Polytechnic Institute and State University (February 2003), Talk: "On the vorticity seeding method: control and generation of vorticity on the boundary." Colloquium.
- Dept. of Mech. Eng., Pittsburgh University U.S.A., (February 2003), Talk: "Formation and evolution of coherent small dimensional patterns in incompressible fluids."
- Dip di Matematica "L.Tonelli," Università degli Studi di Pisa (March 2003), Talk: "Open problems for the Navier-Stokes equations"
- Conference *International Workshop on Nonlinear Partial Differential Equations. Celebration of the* 60^{th} *birthday of Hugo Beirão da Veiga* (Funchal, Portugal, June 25–28, 2003). Talk: "On Taylor–Green vortices." Main Speaker.
- Conference *Workshop on Navier-Stokes equations. Celebration of the* 70^{th} *birthday of Vsevolod A. Solonnikov* (Paderborn, Germany July 18, 2003). Talk: "On the space-time regularity of the $C(0,T;L^3)$ mild solutions to the Navier-Stokes equations."

2004

- Dept. of Math., Università di Ferrara (January 2004), 1 hour seminar on: "On the motion of an incompressible fluid equipped with non-standard boundary conditions."
- Dept. of Math., Magdeburg (Germany, May 2004), Talk: "On the unsteady Navier-Stokes equations under Navier type boundary conditions."

- Dept. of Math., Università di Brescia (May 2004). Talk: "New results on the motion of a line vortex."
- Conference *"P.D.E. in Mathematical Physics", in memory of Olga A. Ladyzhenskaya* (Levico T. ITALY, Oct. 24-30, 2004). Talk: "On commutation errors in the space filtered Navier-Stokes equations". Main Speaker.

2005

- Dept. of Math., Freiburg University (Germany, May 2005). Talk: "Introduction to commutation errors in LES." Colloquium.
- Dept. of Appl. Math., Freiburg University (Germany, May 2005) three-lectures on: "Introduction and perspectives in filtering for nonlinear equations".
- School on Mathematical Theory in Fluid Mechanics, Paseky (Czech Republic, June 25–July 1, 2005), Short communication: "On very-weak solutions to the Navier-Stokes equations".

2006

- CMAF, Lisbon University (March 2006): "On the global evolution of vortex filaments, blobs, and small loops in 3D ideal flows.
- Dep. de Matematica, University of Èvora (Portugal) (April 2006) Talk: "On the regularity of solutions to the 3D Navier-Stokes equations."
- *Workshop Mathematical analysis on fluid mechanics.* Dept. of Math., Universidad Autónoma de Madrid (October 2006): Talk:"Small structures in 3d ideal flows."

2007

- *Meeting on honor of V.A. Solonnikov*, Pisa, (March 28-29, 2007) Talk: "Optimal estimates of Euler schemes for shear-dependent flows."
- *International Conference in Mathematical Fluid Mechanics*, Estoril (Portugal, May 21–25, 2007) Talk: "Statistical Theories of p-fluids." Main Speaker.
- *Joint Meeting DMV/UMI*, Perugia, (June 18–25, 2007.) Talk: "On the Boundary Commutation Error Term in the Numerical Simulation of Turbulent Flows."
- *ICIAM07* Zurich, (Switzerland July 16–20, 2007) Talk: "Recent advances in the discretization of flows with shear dependent viscosities."
- Meeting on conservation laws and continuum mechanics Pisa, (November 28–30, 2007) Talk: "On the geometry of solutions of the Navier-Stokes equations."

2008

- Dep. de Matematicas, IMAFF - CSIC, Madrid (Spain, April 2008) Talk: On the existence of strong solutions for fluids with shear dependent viscosities.
- Dip. of Matematica "L.Tonelli," Università degli Studi di Pisa (March 2008), Talk: "Navier-Stokes equations and regularity."
- Conference *Vorticity, Rotation and Symmetry Stabilizing and Destabilizing Fluid Motion*, CIRM Luminy (France, May 19–23, 2008) Talk: vorticity and regularity for the Navier-Stokes equations. Main speaker.

- Conference *Navier-Stokes equations. Classical and generalized models* (Centro De Giorgi, Pisa, September 21–28 2008.) Talk: Some geometric constraints and the problem of global regularity for the Navier-Stokes equations.

2009

- Conference, *Journées SCASEN : Méthodes mathématiques en mécanique des fluides* (Université Lyon 1, Lyon France, January 20-22 2009.) Talk: "Lower bounds for the Navier-Stokes equations." Main speaker.
- Dept. of Math, Virginia Polytechnic Institute and State University (April 2009), Talk: "On the existence of weak, strong and very-weak solutions. From the Poisson problem to the Stokes equations." Colloquium.
- Conference, *2009 AMS Spring Southeastern Section Meeting Raleigh* (NC, April 4-5, 2009) Talk:"Analysis of an anisotropic scale similarity LES model."
- University Rennes 1, UFR Mathématiques (May 2009) Talk: "On time dependent solution of the Navier-Stokes equations in pipes and applications to one of Leray's problems."
- Conference, *SIAM conference on Mathematical & Computational Issues in the Geosciences, Leipzig* (June 15-18, 2009), Talk: "Analysis of a scale similarity LES model designed for certain stratified flows."
- Conference, *Mathematical Physics and PDEs"* - (Levico, Sept. 6-11, 2009) Talk: "Convergence of approximate deconvolution models to the filtered Navier-Stokes Equations." Main speaker.
- Conference, *QLES2009, Quality and Reliability of Large-Eddy Simulations II.* (Pisa, Sept. 9-11, 2009) Talk "On the analysis of some LES models based on approximate deconvolution and scale similarity."
- Workshop, *LES in Italy.* (Pisa, Sept 12, 2009) Talk: "LES for the Boussinesq equations."
- Dept. of Applied Math. "G. Sansone", Univ. of Firenze, (Nov. 26, 2009) Talk: "On the Space filtered Navier-Stokes equations."

2010

- Workshop *Hyperbolic Conservation Laws and Fluid Dynamics* (Parma, Feb. 15–19, 2010) Talk: "On the inviscid limit for the Navier-Stokes equations with slip boundary conditions." (Main speaker)
- Conference MDF2010 (Rennes, France June 21–24, 2010) Talk: "On the vanishing viscosity limit for the 3D Navier-Stokes equations under slip boundary conditions in general domains" (Main speaker)
- International Summer School on Mathematical Fluid Dynamics (Levico, June 27-July 2, 2010) Talk: "On almost periodic flow in pipes" (Short communication)
- Conference PDEFM2010 (Warwick, UK, July 4–9, 2010) Talk: "On the vanishing viscosity limit for the 3D Navier-Stokes equations in bounded domains" (Main speaker).
- Centre for Nonlinear PDE, Oxford University, (Oct. 2010) Talk: "On averaged equations for turbulent flows."
- Calculus of Variations, Singular Integrals and Incompressible flows, Instituto de Ciencias Matemática (Madrid, Spain, Nov. 2010) Talk: "Fully developed flows in pipes and applications." (Main Speaker).

2011

- Dept. of Math. Univ. of L'Aquila, (Mar. 24, 2011) Talk: "Approximate deconvolution and related models for the Navier-Stokes equations."
- Dept. of Math., Freiburg University (Germany, May 18, 2011). Talk: "On averaged equations for turbulent flows, with applications to Magnetohydrodynamics," SFB Colloquium.
- Universitat Politècnica de Catalunya. Barcelona (Spain, June 9, 2011). Talk: "On the Boussinesq equation."
- Nonlinear Hyperbolic PDEs, Dispersive and Transport Equations, SISSA/ISAS (July 13, 2011). Talk: "Some results on the Boussinesq equations."
- Conference PDE in Mathematical Physics and their Numerical Approximation (Levico, Sept. 4-9, 2011). Talk: "Optimal error estimates for fluid with shear-dependent viscosities."

2012

- Connections Between Regularized and Large-Eddy Simulation Methods for Turbulence, (Banff, Canada, May 13–18, 2012). Talk: "LES and volcanic eruptions."
- Dept. of Math., Univ of Warwick (UK, June 7, 2012). Talk: "An elementary proof of uniqueness of the particle trajectories for solutions of a class of 2D shear-thinning non-Newtonian fluids."
- HYP2012, 14th Intl. Conf. on Hyperbolic Problems: Theory, Numerics, Applications (Padova, June 25–29, 2012). Talk "On the long-time behavior of 2D dissipative Euler equations."
- 6^{th} European Congress of Mathematics. Mini-symposium on 2D Euler equations (Krakow, July 3–7, 2012). Talk: "On the attractors for 2D Euler equations with dissipation."
- International Winter School on Mathematical Fluid Dynamics (Levico Terme, Dec. 16–21, 2012). Talk: "Pulsatile viscous flows in elliptical vessels and annuli, with application to blood and cerebrospinal fluid flow."

2013

- Ercoftac Workshop Direct and Large-Eddy Simulation 9 (Dresden, Germany, April 3–5, 2013). Talk: "Direct numerical simulation of a compressible multiphase flow through the fast Eulerian approach."
- Dept. of Math., Freiburg University (Germany, Apr 23, 2013). Talk: "Attractors for the 2D Euler equations."
- Math. Institute, Basel (Switzerland, Apr. 24, 2013) Talk: "Uniqueness of particle trajectories for incompressible fluids."
- SIAM conference on Mathematical & Computational Issues in the Geosciences, Padova (June 17-20, 2013), Talk: "On the transport of particles in oceanic flows: Modeling, theory and Experiments."
- Conference: Mathematics and Geosciences: Global and Local Perspectives ICMAT, Madrid (Spain, Nov. 4-8, 2013), Talk: "On the Large Eddy Simulation of some multiphase problems in geophysics."
- University Rennes 1, UFR Mathématiques (Dec 2013) Talk: "When mathematicians go climbing .... a volcano." Colloquium.

2014

- Recent Advances in PDEs and Applications (Levico Terme, Feb. 17–21, 2014). Talk: "On suitable weak solutions to the Navier-Stokes equations."

- Dep. of Math. Pisa (April 9, 2014), PDE seminar. Talk: "On the existence of almost periodic solutions for two non standard problems."
- Fluid Dynamics and Electromagnetism: Theory and Numerical Approximation (Levico Terme, June 3-6, 2014). Talk:"On the regularity of solutions of some Boundary Values Problems arising in fluid mechanics."
- Transport, microscales, and fluids @GSSI L'Aquila (L'Aquila, June 9-14, 2014) Talk: "Recent advances in the analysis of multiphase compressible flows"
- Classical Problems and New Trends in Mathematical Fluid Dynamics (Ferrara, Sep 2014) Talk: "On suitable weak solutions"

2015

- *Meeting on honor of L. Nirenberg* (Pisa, June 19 2015) Talk:"Compressible Navier-Stokes equations and applications to volcanology"
- Dept. of Math., Freiburg University (Germany, Jul 5, 2015). Talk: "On the regularity for the Stokes system: old, very old, and rather new"
- Dept. of Math. Darmstadt (Germany, Oct 20 2015). Talk in the International Research Training group "Almost periodic solutions to some problems in fluid mechanics."
- Dept. of Math. Darmstadt (Germany, Oct 21 2015). Talk: "On averaged equations for turbulent flows," Mathematisches Kolloquium.

2016

- University Rennes 1, UFR Mathématiques (Feb 2016) Talk: The Stokes problem: something (not new) about something certainly old.
- Fall Western Sectional Meeting (Denver, CO, October 8-9, 2016) Talk: "On the local energy inequality for the Navier-Stokes equations."
- Freiburg-Pisa Workshop in Math. Analysis (Pisa, October, 21–23, 2016) Talk: "On the energy inequality for viscous fluids"

2017

- Ercoftac Workshop Direct and Large-Eddy Simulation 11 (Pisa, May, 29–31, 2017). Talk: "Large Eddy Simulation Reduced Order Modeling: A Numerical Investigation Of Spatial Filtering"
- Conference IperPV2017 XVII Italian Meeting on Hyperbolic Equations (Pavia, Sep. 6–8, 2017). Talk: "Entropy or physically-relevant solutions in incompressible fluids" (Main Speaker)
- Heriot-Watt Univ. (Edinburgh, Nov. 10, 2017). Talk: "On the regularity for nonlinear systems of the p-Stokes type"
- Mini-Workshop on Singular Variational Problems (Freiburg Germany, Nov, 19, 2017). Talk: "Time averages and Reynolds equations for dissipative equations."

2018

- Conference: Partial Differential equations in fluid mechanics (Pisa, Feb. 5–7, 2018). Talk: "On the Reynolds equations, with applications to ensemble averages."

- New York Univ. Abu Dhabi (Abu Dhabi EAU, April 9, 2018) Talk: "When mathematicians go ...close to a volcano."
- Conference Recent Advances in Nonlinear Analysis (Levico Terme, May 28–30, 2018). Talk: "Classical solutions of the divergence and curl equation with Dirichlet condition."
- Conference Workshop on Mathematical fine structures in fluid dynamics (L'Aquila, June 11-15, 2018) "On the energy conservation for viscous fluids."

2019

- Conference: Elsevier - JMAA Conference on Nonlinear Analysis (AGH, Krakow, Poland, Oct 11-12, 2019) "Turbulent flows as generalized Kelvin-Voigt materials: modeling by non-uniformly elliptic and pseudo-parabolic equations."
- Conference: LIASFMA China-Italy Conference on Partial Differential Equations and Their Applications (Fudan Univ Shanghai, PRC, Dec 9–13, 2019) "On the energy equality and inequality for the 3D Navier-Stokes."

2021

- Conference Analysis Day - on the occasion of the retirement of Professor Reinhard Farwig (Darmstadt June 18, 2021) "Natural second-order regularity for parabolic systems."
- Conference: PDEs and continuum mechanics (RI$\int$M, Varese, July 21-23, 2021) "Boundary regularity for elliptic/parabolic systems."
- Workshop "TURB1D 2021" (Santander Spain, Nov. 2–3, 2021) "On the unsteady rotational Smagorinsky (Baldwin-Lomax) model"

2022

- International Conference on Nonlinear Differential Equations and Applications (Évora, Portugal Jul. 3–6, 2022) "Pseudo monotone operators and the unsteady rotational Smagorinsky model"

2023

- Computer, Electrical and Mathematical Sci. and Eng. Dept., (KAUST, Saudi Arabia, Feb. 7, 2023) Talk: "On the Mathematics of turbulent flows"
- New York Univ. Abu Dhabi (Abu Dhabi EAU, April 25, 2023) Talk: "On rotational eddy viscosity models"
- Computer, Electrical and Mathematical Sci. and Eng. Dept., (KAUST, Saudi Arabia, May 9, 2023) Colloquium: "On some nonlinear elliptic/parabolic systems arising in mechanics and turbulence"
- Conference: meeting on nonlinear evolution pdes, fluid dynamics and transport equations (Erice, May 25–31, 2023) Talk: "Eddy viscosity models based on vorticity".
- Politecnico di Milano (Milan, Jun 29, 2023) Talk: "Energy conservation or anomalous dissipation for incompressible fluids".
- Università di Firenze (Firenze, Dec. 6, 2023) Meeting: MathAnalysis@UniFIPISI V, Talk: "Energy conservation for incompressible viscous fluids".

2024

- Mathematical Institute, Oxford (Oxford UK, May 6, 2024) Talk: "On Galerkin approximations of the 2D Euler equations".

- Wave Dynamics and Fluid Structure Interactions, (Como May 27-31 2024). Talk: "Fourier-Galerkin approximation of the solutions of the 2D Euler equations with bounded vorticity".
- AMS UMI joint meeting (Palermo, July 23-26, 2024). Talk: "Boundary layers equations with an eddy viscosity vanishing at the boundary."
- Nonlinear Partial Differential Equations in Freiburg (Freiburg Germany, Oct. 2-4, 2024) Talk: "Geometrical criteria and "regular" solutions to the Navier-Stokes equations."

2025

- Fluids@PoliMi (Jan 8-10, 2025) Talk: "Absence of anomalous dissipation for weak solutions of the Maxwell-Stefan system."
- 13th Meeting on Nonlinear Evolution PDEs, Fluid Dyn. and Transport Eqs, (Sissa, Feb 17–21, 2025) Talk: "On the Geometry of regular solutions to the 3D Navier-Stokes equations."
- Boundary Analysis for Dispersive and Viscous Fluids, (Pavia, Sep 3-5 2025) Talk:"Pulsatile flow for a simplified smart fluid with variable power-law: Analysis and numerics"

Theses

1. *On the global existence for the solutions to the equations of ideal fluids (Italian)* (degree thesis) 86 pp., 1995, University of Pisa/Scuola Normale Superiore, directed by Prof. H. Beirão da Veiga
2. *Some topics in fluid mechanics*, Ph.D. Thesis; Pubblicazione del Dipartimento di Matematica "L. Tonelli" dell'Università di Pisa, **2.362.1230** (2000), vi+129pp. An italian summary appears in Boll. Unione Mat. Ital. Sez. A Mat. Soc. Cult. (8) **III-A** (2000), 271–274.

Books

- Luigi C. Berselli, *Three-Dimensional Navier-Stokes Equations for Turbulence*, Mathematics in Science and Engineering. Academic Press, London, [2021], Â©2021. xiii+313 pp. ISBN: 978-0-12-821954-6 MR 4284207 link
- Luigi C. Berselli, Traian Iliescu, and William J. Layton *Mathematics of Large Eddy Simulation of Turbulent Flows,* pp. xviii+348, (2006), ISBN 3-540-26316-0 Springer series in Scientific Computation. MR 2185509 (2006h:76071) Publisher link

Research papers (in reverse chronological order)

115. Luigi C. Berselli, Alessio Falocchi, and Rossano Sannipoli, *On a 3D Stokes eigenvalue problem under Navier slip-with-friction boundary conditions and applications to Navier-Stokes equations*, Z. Angew. Math. Phys. **76**, 175 (2025) doi:10.1007/s00033-025-02556-0

114. Luigi C. Berselli and Alex Kaltenbach, *Convergence analysis for a finite element approximation of the unsteady $p(\cdot,\cdot)$-Navier–Stokes equations*, Numer. Math. **157**, no. 2, 573–627 (2025) doi:10.1007/s00211-025-01450-1

113. Luigi C. Berselli, Stefanos Georgiadis and Athanasios E. Tzavaras, *Absence of anomalous dissipation for weak solutions of the Maxwell-Stefan system*, Nonlinearity **38** (2) 025018 (2025) doi:10.1088/1361-6544/ada7b8

112. Chérif Amrouche, Luigi C. Berselli, François Legeais, Guillaume Leloup, and Roger Lewandowski, *Singular boundary condition for a degenerated turbulent toy model*, Pure Appl. Funct. Anal. **10** 11–29 (2025).

111. Luigi C. Berselli and Alex Kaltenbach, and Michael Růžička, *Energy conservation for weak solutions of incompressible Newtonian fluid equations in Hölder spaces with Dirichlet boundary conditions in the half-space*, Math. Ann. **391**, no. 4, 5911–5940 (2025). doi:10.1007/s00208-024-03065-7

110. Luigi C. Berselli and Alex Kaltenbach, *Error analysis for a finite element approximation of the steady $p(\cdot)$-Navier–Stokes equations*, IMA J. Numer. Anal. **45**, no. 5, 3026–3076 (2025). doi:10.1093/imanum/drae082

109. Luigi C. Berselli, Elisabetta Chiodaroli, and Rossano Sannipoli, *Energy conservation for 3D Euler and Navier-Stokes equations in a bounded domain. Applications to Beltrami flows*, J. Nonlinear Sci., **35**: 10 (2025) doi:10.1007/s00332-024-10102-x

108. Luigi C. Berselli and Rossano Sannipoli, *Velocity-vorticity geometric constraints for the energy conservation of 3D ideal incompressible fluids*, J. Geom. Anal. **34**, 259 (2024). doi:10.1007/s12220-024-01704-8

107. Luigi C. Berselli and Stefano Spirito, *Fourier-Galerkin approximation of the 2D Euler equations*, J. Hyperbolic Differ. Equ. **21** (3) 503–522 (2024). doi:10.1142/S0219891624400010

106. Luigi C. Berselli, *On a Rotational Smagorinsky Model for Turbulent Fluids: An Overview of Recent Results in the Steady and Unsteady Cases.* In: Beirão da Veiga, H., Minhós, F., Van Goethem, N., Sanchez Rodrigues, L. (eds) Nonlinear Differential Equations and Applications. pp 27–46 PICNDEA 2022. CIM Series in Mathematical Sciences, vol 7. Springer, Cham. doi:10.1007/978-3-031-53740-0_2

105. Luigi C. Berselli and Stefanos Georgiadis, *Three results on the Energy conservation for the 3D Euler equations*, NoDEA Nonlinear Differential Equations Appl. 31:33 (2024) doi:10.1007/s00030-024-00924-9

104. Luigi C. Berselli, François Legeais, and Roger Lewandowski, *Surface boundary layers through a scalar equation with an eddy viscosity vanishing at the ground*, ESAIM Math. Model. Numer. Anal. **58**, 489–513 (2024) doi:10.1051/m2an/2024009

103. Luigi C. Berselli, *Energy conservation for weak solutions of incompressible fluid equations: the Hölder case and connections with Onsager's conjecture*, J. Differential Equations **368**, 350–375 (2023). doi:10.1016/j.jde.2023.06.002

102. Luigi C. Berselli, *On the vorticity direction and the regularity of 3D Navier-Stokes equations*, Nonlinearity **36** 4303–4313 (2023) doi:10.1088/1361-6544/ace096

101. Luigi C. Berselli, Alex Kaltenbach, Roger Lewandowski, and Michael Růžička, *On the existence of weak solutions for a family of unsteady rotational Smagorinsky models*, Pure Appl. Funct. Anal. **8**, 83–102 (2023). link

100. Luigi C. Berselli, *Remarks on the "Onsager singularity theorem" for Leray-Hopf weak solutions: the Hölder continuous case*, Mathematics **11**, (4) 1062 (2023) doi:10.3390/math11041062

99. Luigi C. Berselli and Stefano Spirito, *Convergence of second-order in time numerical discretizations for the evolution Navier-Stokes equations*, Adv. Contin. Discrete Models (2022) 65
doi:10.1186/s13662-022-03736-2

98. Luigi C. Berselli and Michael Růžička, *Natural second order regularity for systems in the case* $1 < p \leq 2$ *using the A-approximation*, 3–37 (2022) In Carapau, F., Vaidya, A. (eds) Recent Advances in Mechanics and Fluid-Structure Interaction with Applications. Advances in Mathematical Fluid Mechanics. Birkhäuser, Cham. doi:10.1007/978-3-031-14324-3_1

97. Luigi C. Berselli, and Michael Růžička, *Natural second-order regularity for parabolic systems with stress tensor with* (p, δ)*-structure and depending only on the symmetric gradient*, Calc. Var. Partial Differential Equations. **61**, 137 (2022) doi:10.1007/s00526-022-02247-y

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95. Mohamed Abdelwahed, Luigi C. Berselli and Nejmeddine Chorfi, *On the uniqueness for weak solutions of steady double-phase fluids* Adv. Nonlinear Anal. **11** (2022) 454–468. doi:10.1515/anona-2020-0196

94. Luigi C. Berselli, Alex Kaltenbach, and Michael Růžička, *Analysis of fully discrete, quasi non-conforming approximations of evolution equations and applications*, Math. Models Methods Appl. Sci. **31** (2021) 2297–2343 doi:10.1142/S0218202521500494

93. Luigi C. Berselli and Michael Růžička, *Optimal error estimate for a space-time discretization for incompressible generalized Newtonian fluids: The Dirichlet problem*, SN Partial Differ. Equ. Appl. **2** (2021) 59 doi:10.1007/s42985-021-00082-y

92. Luigi C. Berselli and Elisabetta Chiodaroli, *Remarks On the energy equality for the 3D Navier–Stokes equations*, In: Bodnár T., Galdi G.P., Nečasová Š. (eds) Waves in Flows (2021), pp 91-107. Advances in Mathematical Fluid Mechanics. Birkhäuser, Cham. doi:10.1007/978-3-030-68144-9_3

91. Luigi C. Berselli and Stefano Spirito, *On the existence of Leray-Hopf Weak Solutions to the Navier-Stokes equations*, Fluids (2021), 6(1), 42 doi:10.3390/fluids1010000

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89. Luigi C. Berselli and Dominic Breit, *On the existence of weak solutions for the steady Baldwin-Lomax model and generalizations*, J. Math Anal. Appl. **501** (2021), 124643 doi:10.1016/j.jmaa.2020.124633

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85. Cherif Amrouche, Luigi C. Berselli, Roger Lewandowski, and Dinh Duong Nguyen, *Turbulent flows as generalized Kelvin-Voigt materials: modeling and analysis*, Nonlinear Anal. **196** (2020) 111790 doi:10.1016/j.na.2020.111790

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83. Luigi C. Berselli and Elisabetta Chiodaroli, *On the energy equality for the 3D Navier–Stokes equations*, Nonlinear Anal.**192** (2020) 111704, 24 pp doi:10.1016/j.na.2019.111704

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78. Vieri Benci, Luigi C. Berselli, and Carlo R. Grisanti, *The Caccioppoli Ultrafunctions*, Adv. Nonlinear Anal. (2019) 8(1): 946–978. doi:10.1515/anona-2017-0225

77. Luigi C. Berselli and Davide Catania, *A note on the Euler–Voigt System in a 3D Bounded Domain: Propagation of Singularities and Absence of the Boundary Layer*, AIMS Mathematics, **4(1)** (2019) 1–11. doi:10.3934/Math.2019.1.1

76. Luigi C. Berselli, David Wells, Traian Iliescu, and Xuping Xie, *Large Eddy Simulation Reduced Order Models*, pp.151–157 in Direct and Large-Eddy Simulation XI. Springer Verlag. ERCOFTAC Series, Vol. 25 M. V. Salvetti *et al.* (Eds.) 2019 XXV, 551 p. 390 illus. ISBN 978-3-030-04915-7, doi:10.1007/978-3-030-04915-7_21

75. Luigi C. Berselli and Placido Longo, *Classical solutions for the system curl $v = g$, with vanishing Dirichlet boundary conditions*, Discrete Contin. Dynam. Systems Series S. **12** (2019) 215–229 doi:10.3934/dcdss.2019015

74. Luigi C. Berselli and Roger Lewandowski, *On the Bardina's model in the whole space*, 2018 J. Math. Fluid Mech. **20** (2018) 1335–1351. doi:10.1007/s00021-018-0369-2

73. Luigi C. Berselli and Stefano Spirito, *On the convergence of a fully discrete scheme of LES type to physically relevant solutions of the incompressible Navier-Stokes*, (2018) Z. Angew. Math. Phys. **69** 61 doi:10.1007/s00033-018-0955-4

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71. Luigi C. Berselli and Stefano Spirito, *On the construction of suitable weak solutions to the 3D Navier–Stokes equations in a bounded domain by an artificial compressibility*, Commun. Cont. Math. **20** (2018) 1650064 (16 pages). MR 3714830 doi:10.1142/S0219199716500644

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