Curriculum Vitae

Matteo Negri
Associate Professor in Mathematical Analysis
Department of Mathematics - University of Pavia
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email: matteo.negri@unipv.it
home page: http://mate.unipv.it/negri
Scopus: https://www.scopus.com/authid/detail.uri?authorId=56246432000

Graduate Studies and Academic Positions

1996-2001 Ph.D. in Functional Analysis and Applications. SISSA, Trieste.

2001-2002 Post Doc at the Max Planck Institute for Mathematics in the Sciences, Leipzig.

2002-2014 Researcher in Mathematical Analysis, University of Pavia.

2014-present Associate Professor in Mathematical Analysis, University of Pavia.

Research Overview

Field. Calculus of Variations.

Subjects. Free-discontinuity problems, Γ-convergence, BV and BD functions, Rate-Independent Evolutions, Gradient Flows, Finite Element Methods.

Applications. Mathematical Models for Fracture and Damage, Continuum Mechanics (Finite and Linearized Elasticity), Computational Mechanics, Image Segmentation.

Publications

Publications by subject

Approximation of Free Discontinuity Problems by Γ-convergence [1, 2, 4, 5, 6, 7, 9, 10, 13, 34]

Quasi-static Evolutions for Brittle and Cohesive Fracture [8, 11, 14, 15, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 31, 30, 29, 32, 35, 42, 43, 44]

Dynamical models for Cohesive Fracture [39]

BV-evolutions and Gradient Flows [24, 37]

Finite and Linearized Elasticity [3]

Equilibrium Configuration of Liquid Droplets [12]

Finite Elements and Isogeometric Methods [16, 33, 38, 40, 41]

Published

[1] M. Negri: The anisotropy introduced by the mesh in the finite element approximation of the Mumford-Shah functional. *Numer. Funct. Anal. Optim.* **20**(9-10) 957–982 (1999)

[2] M. Negri, M. Paolini: Numerical minimization of the Mumford-Shah functional. *Calcolo* **38**(2) 67–84 (2001)

[3] G. Dal Maso, M. Negri, D. Percivale: Linearized elasticity as Γ-limit of finite elasticity. *Set-Valued Anal.* **10**(2-3) 165–183 (2002)

[4] M. Morini, M. Negri: Mumford-Shah functional as Γ-limit of discrete Perona-Malik energies. *Math. Models Methods Appl. Sci.* **13**(6) 785–805 (2003)

[5] M. Negri: A finite element approximation of the Griffith's model in fracture mechanics. *Numer. Math.* **95**(4) 653–687 (2003)

[6] M. Negri: A discontinuous finite element approximation of free discontinuity problems. *Adv. Math. Sci. Appl.* **15**(1) 283–306 (2005)

[7] M. Negri: A non-local approximation of free discontinuity problems in SBV and SBD. *Calc. Var. Partial Differential Equations* **25**(1) 33–62 (2006)

[8] C. Comi, S. Mariani, M. Negri, U. Perego: A 1d variational formulation for quasi-brittle fracture. *Journal of Mechanics of Materials and Structures* **1**(8) 1323–1343 (2006)

[9] M. Negri: Convergence analysis for a smeared crack approach in brittle fracture. *Interfaces Free Bound.* **9**(3) 307–330 (2007)

[10] L. Lussardi, M. Negri: Convergence of non-local finite element energies for fracture mechanics. *Numer. Funct. Anal. Optimization* **28**(1-2) 83–109 (2007)

[11] M. Negri, C. Ortner: Quasi-static propagation of brittle fracture by Griffith's criterion. *Math. Models Methods Appl. Sci.* **18**(11) 1895–1925 (2008)

[12] M. Negri, R. Rosso: On the stability of liquid droplets with line tension. *Cont. Mechanics Thermodyn.* **21** 173–194 (2009)

[13] F. Fraternali, M. Negri, M. Ortiz: On the convergence of 3d free discontinuity models in variational fracture mechanics. *Int. J. Fract.* **166** 3–11 (2010)

[14] M. Negri: A comparative analysis on variational models for quasi-static brittle crack propagation. *Adv. Calc. Var.* **3** 149–212 (2010)

[15] M. Negri: From rate-dependent to rate-independent brittle crack propagation. *J. Elasticity* **98**(2) 159–178 (2010)

[16] A. Lew, M. Negri: Optimal convergence of a discontinuous-galerkin-based immersed boundary method. *ESAIM Math. Model. Numer. Anal.* **45** 651–674 (2011)

[17] M. Negri: Energy release rate along a kinked path. *Math. Meth. Appl. Sci.* **34** 384–396 (2011)

[18] A. Khludnev, M. Negri: Crack on the boundary of a thin elastic inclusion inside an elastic body. *ZAMM Z. Angew. Math. Mech.* **92** 341–354 (2011)

[19] A. Khludnev, M. Negri: Equilibrium of Elastic Solids with Thin Elastic Inclusions. *Dokl. Phys.* **57** 140–144 (2012)

[20] M. Negri: Crack propagation by a Regularization of the Principle of Local Symmetry. *Discrete Contin. Dyn. Syst. Ser. S* **6** (2013) 147–165

[21] A. Khludnev, M. Negri: Optimal rigid inclusion shapes in elastic bodies with cracks. *Z. Angew. Math. Phys.* **64** (2013) 179–191

[22] M. Negri: From phase-field to sharp crack: convergence of quasi-static evolutions in a special setting. *Appl. Math. Lett.* **26** (2013) 219–224

[23] M. Negri, C. Zanini: From finite to linear elastic fracture mechanics by scaling. *Calc. Var. Partial Differential Equations* **50** (2014) 525–548

[24] M. Negri: Quasi-static rate-independent evolutions: characterization, existence, approximation and application to fracture mechanics. *ESAIM Control Optim. Calc. Var.* **20** (2014) 983–1008

[25] M. Negri, R. Toader: Scaling in fracture mechanics by Bazant's law: from finite to linearized elasticity. *Math. Models Methods Appl. Sci.* **25** (2015) 1389–1420

[26] M. Negri: Quasi-static evolutions in brittle fracture generated by gradient flows: sharp crack and phase-field approaches. *Lect. Notes Appl. Comput. Mech.* **81** (2016) 197–216

[27] M. Negri: A simple derivation and classical representations of energy variations for curved cracks. *Appl. Math. Optim.* **75** (2017) 99–116

[28] D. Knees, M. Negri: Convergence of alternate minimization schemes for phase field fracture and damage. *Math. Models Methods Appl. Sci.* **27** (2017) 1743–1794

[29] M. Negri, R. Scala: A quasi-static evolution generated by local energy minimizers for an elastic material with a cohesive interface. *Nonlinear Anal. Real World Appl.* **38** (2017) 271–305

[30] M. Negri, E. Vitali: Approximation and characterization of quasi-static H^1-evolutions for a cohesive interface with different loading-unloading regimes. *Interfaces Free Bound.* **20** (2018) 25–67

[31] M. Negri: A unilateral L^2-gradient flow and its quasi-static limit in phase-field fracture by alternate minimization. *Adv. Calc. Var.* **12** (2019) 1–29

[32] S. Almi, S. Belz, M. Negri: Convergence of discrete and continuous unilateral flows for Ambrosio-Tortorelli energies and application to mechanics. *ESAIM Math. Model. Numer. Anal.* **53** (2019) 659–699

[33] M. Montardini, M. Negri, G. Sangalli, M. Tani: Space-Time Least-Squares Isogeometric Method and Efficient Solvers for Parabolic Problems. *Math. Comp.* **89** (2020) 1193–1227.

[34] M. Negri: Γ-convergence for high order phase field fracture: continuum and isogeometric formulations. *Comput. Methods Appl. Mech. Engrg.* **362** (2020) 112858

[35] S. Almi, M. Negri: Analysis of staggered evolutions for nonlinear energies in phase field fracture. *Archive Ration. Mech. Anal.* **236** (2020) 189–252

[36] M. Negri: A quasi-static model for craquelure patterns. *Mathematical Modeling and Analysis of degradation and restoration in Cultural Heritage* Springer INdaM Series **41** (2021) 147–164

[37] M. Kimura, M. Negri: Weak solutions for unidirectional gradient flows: existence, uniqueness, and convergence of time discretization schemes. *NoDEA Nonlinear Differential Equations Appl.* **28** (2021) #59

[38] A. Marengo, A. Patton, M. Negri, U. Perego, A. Reali: A rigorous and efficient explicit algorithm for irreversibility enforcement in phase-field finite element modeling of brittle crack propagation. *Comput. Methods Appl. Mech. Engrg.* **387** (2021) 114137

[39] M. Negri, R. Scala: Existence, energy identity and higher time regularity of solutions to a dynamic visco-elastic cohesive interface model. *SIAM J. Math. Anal.* **53** (2021) 5682–5730

[40] B. Grossman-Ponemon, A.J. Lew, M. Negri: Analysis of a Method to Compute Mixed-Mode Stress Intensity Factors for Non-Planar Cracks in Three-Dimensions. *ESAIM Math. Model. Numer. Anal.* **57** (2023) 1195-1223

[41] L. Greco, A. Patton, A. Marengo, M. Negri, U. Perego, A. Reali: Higher order phase-field modeling of brittle fracture via Isogeometric Analysis. *Eng. Comp.* (2024)

To appear

[42] M. Negri: Homogenization of Griffith's Criterion for brittle Laminates. *Archive Ration. Mech. Anal.*

[43] M. Negri: Modelling paintings on canvas and simulation of local crack patterns. *Mathematical Modeling and Analysis of degradation and restoration in Cultural Heritage* Springer INdaM Series

Submitted

[44] B. Grossman-Ponemon, E. Maggiorelli, A.J. Lew, M. Negri: How do cracks in brittle materials evolve, and how do we compute them?

Plenary and Keynote Lectures

1. Fast and quasi-static propagation of a fracture in brittle materials. *GIMC 2008, XVII Convegno Italiano di Meccanica Computazionale* (Alghero, 2008)
2. Consistency of phase-field with sharp crack evolutions in brittle fracture. *CFRAC 2013* (Prague, 2013)

Lectures at National and International Conferences

1. Finite element approximation of free-discontinuity problems. *Giornate di Lavoro su Questioni di Teoria Geometrica della Misura e di Calcolo delle Variazioni* (Levico Terme, 2000)
2. Finite element approximation of the Mumford-Shah functional. *SIMAI 2000* (Ischia, 2000)
3. Linear elastic energies as Γ-limit of non-linear energies. *Giornate di Lavoro su Questioni di Teoria Geometrica della Misura e di Calcolo delle Variazioni* (Levico Terme, 2001)
4. A discontinuous finite element approach for the approximation of free discontinuity problems. *Workshop on Computational and Variational Problems in Fracture Mechanics* (Trieste, 2002)
5. On the relationship between Mumford-Shah functional and Perona-Malik equation. *Giornate di Studio Politecnico di Milano - Università di Pavia* (Pavia, 2003)
6. Non-local approximation of free-discontinuity problems and applications. *Incontro di Lavoro su Questioni di Teoria Geometrica della Misura e di Calcolo delle Variazioni* (Levico Terme, 2004)
7. Finite element discretizations of the Griffith energy. *First Workshop on Contact Mechanics and Free Discontinuity Problems* (Salerno, 2004)
8. A discontinuous finite element approach for brittle fracture. *SIMAI 06* (Ragusa, 2006)
9. Fracture energies as limit of non-local damage energies. *VII World Congress on Computational Mechanics* (Los Angeles, 2006)
10. Quasi-static propagation and Griffith's criterion. *XVII Giornate di Lavoro su Questioni di Teoria Geometrica della Misura e di Calcolo delle Variazioni* (Levico Terme, 2007)
11. Quasi-static crack propagation in a brittle material. *Mathematical Modeling, Mechanics and Materials* (Brixen, 2007)
12. Quasi-static crack propagation in a brittle material. *SIAM Conference on Mathematical Aspects in Materials Science* (Philadelphia, 2008)
13. Quasi-static evolutions of a brittle crack: analytical and numerical aspects in a model case. *Fracture: modelling, analysis and computation* (Oxford, 2008)
14. Rate-independent evolutions in fracture mechanics *Rate-independent systems: Modeling, Analysis, and Computations* (Banff, 2010)
15. Mixed Mode Crack Propagation by the Principle of Local Symmetry *XXI Convegno Nazionale di Calcolo delle Variazioni* (Levico Terme, 2011)
16. Crack Propagation by PLS *Mathematical Models, Analysis, and Numerical Methods for Dynamic Fracture* (Oberwolfach, 2011)
17. Rate-dependent and rate-independent crack propagation. *CFRAC 2011* (Barcelona, 2011)
18. Crack Propagation in Mode I-II by a regularization of PLS. *Phase Separation, Damage and Fracture* (Berlin, 2011)
19. Brittle Crack Propagation in Mixed Mode. *Variational Methods in Evolutions* (Oberwolfach, 2011)
20. From finite to linear elastic fracture mechanics by scaling. *Evolution Problems in Damage, Plasticity and Fracture* (Udine, 2012)
21. Analysis of finite and linear elasticity in quasi-static brittle fracture. *IUTAM Symposium: Fracture Phenomena in Nature and Technology* (Brescia, 2012)
22. Scaling in fracture mechanics by Bazant's law: from finite to linearized elasticity. *IX Giornata di Studio Università di Pavia - Politecnico di Milano* (Pavia, 2013)

23. Energy based rate-independent evolutions: existence and convergence. *10th AIMS Conference on Dynamical Systems, Differential Equations and Applications* (Madrid, 2014)

24. Quasi-static evolutions for phase field models in fracture. *IUTAM Symposium on Innovative Numerical Approaches for Materials and Structures in Multi-field and Multi-scale Problems* (Burg Schennelberg, 2014)

25. BV evolutions in phase field fracture. *AMS-EMS-SPM International Meeting* (Porto, 2015)

26. Phase-field approach for quasi-static evolutions in fracture mechanics. *International Congress on Industrial and Applied Mathematics* (Beijing, 2015)

27. Full characterization of quasi-static H^1- evolutions for a cohesive interface model. *International Congress on Industrial and Applied Mathematics* (Beijing, 2015)

28. Convergence in time of discrete evolutions generated by alternate minimizing schemes. *Variational Models of Fracture* (Banff, 2016)

29. Flussi gradiente ed evoluzioni quasi-statiche per il funzionale di Ambrosio-Tortorelli: aspetti teorici ed applicazioni. *Convegno GNAMPA* (Montecatini, 2016)

30. Parametrized evolutions for cohesive fracture generated by local minimizers and equilibria. *Mini-workshop on Dislocations, Plasticity and Fracture* (SISSA, 2017)

31. Rate-independent unilateral evolutions for Ambrosio-Tortorelli functionals and applications. *Control of state constrained dynamical systems* (Padova, 2017)

32. Gradient flows and quasi-static evolutions in phase-field fracture. *Variational Methods for the Modelling of Inelastic Solids* (Oberwolfach, 2018)

33. Alternate minimizing schemes for evolutions in phase-field fractures. *New trends in the variational modeling of failure phenomena* (Wien, 2018)

34. Quasi-static evolutions in phase-field fracture. *Topics in Nonlinear Analysis: Calculus of Variations and PDEs* (Lisboa, 2018)

35. Contraints and penalties for phase-field flows in $\mathbb{R}^2$ and $\mathbb{R}^N$. *Phase Field models of Fracture* (Banff, 2019)

36. Quasi-static evolutions for layered brittle materials and applications to craquelure. *MACH2019 - Mathematical modeling and Analysis of degradation and restoration in Cultural Heritage* (Roma, 2019)

37. Convergence of evolutions generated by staggered minimization schemes. *Recent advances in phase-field modeling: from engineering to biology* (Pavia, 2019)

38. Dynamics of visco-elastic bodies with a cohesive interface. *8ECM - European Congress of Mathematics* (Portoroz, 2021)

39. Characterization of quasi-static evolutionsgenerated by alternate minimization. *SIMAI 2020+2021* (Parma, 2021)

40. Homogenization of quasi-static crack propagation in brittle layered materials. *MACH2021 - Mathematical modeling and Analysis of degradation and restoration in Cultural Heritage* (Roma, 2021)

41. Homogenization of Griffith's criterion for brittle laminates. *Beyond Elasticity: Advances and Research Challenges* (CIRM, Luminy, 2022)

42. Gradient flows for separately convex phase-field energies. *PHAME 2022 - PHAse field MEthods in applied sciences* (Rome, 2022)

43. Stress and crack patterns in painting on canvas *MACH23 - Mathematical modeling and Analysis of degradation and restoration in Cultural Heritage* (INdAM, Rome, 2023)

44. Phase-field evolutions generated by staggered minimization schemes *Variational Models for Material Failure* (Erlangen, 2023)
45. Evolutionary Γ-convergence and homogenization of brittle fracture *Variational and Geometric Structures for Evolution* (Levico Terme, 2023)
46. Energy release rate and Griffith's criterion for phase field fracture. *Fracture as an emergent Phenomenon* (MFO, Oberwolfach, 2024)
47. Fracture Mechanics: from Analysis to Applications *Spring Workshop COMPMAT* (Pavia, 2024)
48. Evolutionary Γ-convergence and effective toughness in brittle periodic laminates. *International Conference on Elliptic and Parabolic Problems* (Gaeta, 2024)

Seminars at Universities and Research Centers

1. Finite element approximation of free discontinuity problems. (Max Planck Institute for Mathematics in the Sciences, 2001)
2. Linearized elasticity as Γ-limit of finite elasticity. (Max Planck Institute for Mathematics in the Sciences, 2002)
3. Linear elastic energies as Γ-limit of non-linear energies. (Università di Pavia, 2002)
4. Approximation of free-discontinuity problems. (Università di Pavia, 2003)
5. Linearization of elastic energies by Γ-convergence. (Università di Salerno, 2003)
6. A mathematical model for crack propagation: formulation as a free-discontinuity problem and its embedded crack discretization. (Politecnico di Milano, 2003)
7. Il modello di Griffith per la propagazione delle fratture: una formulazione variazionale e una approssimazione con elementi finiti discontinui. (Politecnico di Milano, 2004)
8. A nonlocal approach for the Perona-Malik equation and the Mumford-Shah functional. (SISSA, 2004)
9. Un approccio non-locale per l'equazione di Perona-Malik e il funzionale di Mumford-Shah. (Università di Trieste, 2004)
10. Un modello per la propagazione di fratture fragili: formulazione come problema con discontinuità libere e discretizzazione con elementi finiti smeared-crack. (Università Statale di Milano, 2004)
11. Mathematical models for material damage and fracture. (Università di Salerno, 2005)
12. Approssimazione di problemi con discontinuità libere: applicazioni al danneggiamento e alla frattura. (Università di Ferrara, 2006)
13. Stability of liquid droplets with line tension. (SISSA, 2007)
14. Comparing quasi-static evolutions of a brittle crack. (Universidad Complutense, 2007)
15. Analytical and numerical aspects of quasi-static crack propagation. (Technische Universität München, 2007)
16. From rate-dependent to quasi-static crack propagation. (Stanford, 2008)
17. Analysis of crack propagation by the Principle of Local Symmetry. (Stanford, 2010)
18. Propagazione di fratture in Modo I: analisi, discretizzazione ed applicazioni. (Politecnico di Milano, 2011)

19. Propagazione di Fratture in Modo Misto secondo il Principio di Locale Simmetria. (Università di Salerno, 2011)
20. Scaling finite to linearized elasticity in quasi-static brittle fracture. (SISSA, 2012)
21. Quasi-static rate-independent evolutions: characterization, existence and application to fracture. (SISSA, 2013)
22. Quasi-static evolutions by graph parametrization: existence, approximation and application to fracture. (WIAS, 2014)
23. A general approach to BV-solutions by parametrized minimising movements: theoretical results and applications (TU Eindhoven, 2014)
24. Gradient flows and quasi-static evolutions in phase-field fracture. (Kanazawa University, 2016)
25. Quasi-static evolutions for elastic materials with cohesive interfaces. (Kanazawa University, 2017)
26. Discrete schemes for unilateral gradient flows in phase-field fracture. (SISSA, 2018)
27. Effective toughness for periodic brittle laminates. (WPI Math Colloquium, 2021)
28. Effective toughness of brittle composite laminates. (Oberseminar Angewandte Mathematik, Freiburg University, 2022)
29. Griffith's criterion for sharp crack and phase field fracture (Frascal Virtual Colloquium, Erlangen University, 2023)

Reviewer

Referee

- *Adv. Calc. Var.*
- *AIMS Math.*
- *Ann. Mat. Pura Appl.*
- *Appl. Math. Optim.*
- *Arch. Rational Mech. Anal.*
- *Comput. Math. Appl.*
- *Comp. Mech.*
- *Comput. Methods Appl. Mech. Engrg.*
- *Discrete Contin. Dyn. Syst-S*
- *Eng. Comp.*
- *Eur. J. Mech. A-Solids*
- *ESAIM Control Optim. Calc. Var.*
- *IMA J. Numer. Anal.*
- *Interfaces Free Bound.*
- *Int. J. Fracture*
- *J. Elast.*
- *J. London Math. Soc.*
- *J. Mech. Phys. Solids*
- *J. Nonlinear Sci.*
- *Math. Eng.*
- *Math. Methods Appl. Sci.*
- *Math. Model. Numer. Anal.*
- *Math. Models Methods Appl. Sci.*

- *Meccanica*
- *Mech. Res. Comm.*
- *Nonlinear Anal. - Real World Appl.*
- *SIAM J. Math. Anal.*
- *Z. Angew. Math. Mech.*
- *Z. Angew. Math. Phys.*

Reviewer

- Mathematical Reviews: 49J45, 49S05, 74G65, 74R10, 74R20
- Banff International Research Station (BIRS)
- Czech Science Foundation (GACR)
- Deutsche Forschungsgemeinschaft (DFG)

Funded projects

- CNR Short-Term Mobility Program 2006
- CARIPLO Landau Network Fellowship 2012 (with Prof. A.Khludnev)
- INdAM GNAMPA 2014

Visiting

California Institute of Technology (June 26 - July 30, 2007)

Awards

Timoshenko Scholar, Stanford (2010)

Congress Organization

Variational Views in Mechanics and Materials (Pavia, 2013)

Committee

Jury “rapporteur” for the Ph.D. thesis of P. Sicsic (Ecole Polytechnique, 2013)
Member of the Committee for an ”Assegno di Ricerca” in Analysis (Pavia, 2015 and 2020)

Board of Ph.D. Programs

Member of the Board (Collegio Docenti) of the Ph.D. in “Design, Modeling, and Simulation in Engineering” (University of Pavia) (from 17/18 to 23/24)

Administration

“Referente” for the M.Sc. in Mathematics (from 23/24)

Affiliations

Associato di Ricerca presso IMATI - CNR, Pavia (2019-present)

Teaching: courses

B.Sc. in Mathematics and B.Sc. in Physics

i) Basic Mathematical Analysis (teaching assistant) (03/04)
ii) Analysis A (3 ECTS) (08/09)
iii) Analysis D (6 ECTS) (09/10 and 10/11)
iv) Analysis 4 (9 ECTS) (11/12)
v) Analysis 1 (9 ECTS) (from 19/20 to 23/24)

M.Sc. in Mathematics

i) Variational Methods (3 ECTS) (04/05)
ii) Advanced Mathematical Analysis (3 ECTS) (05/06)
iii) Calculus of Variations (3 ECTS) (06/07) and (6 ECTS) (12/13)
iv) Functional Analysis and Differential Equations (3 ECTS) (07/08, 12/13) and (6 ECTS) (from 14/15 to 23/24)

B.Sc. in Biotechnologies

i) Mathematical Analysis and Computing (teaching assistant) (02/03)
ii) Mathematical Analysis and Computing (9 ECTS) (from 03/04 to 09/10)

B.Sc. in Engineering

i) Mathematical Methods in Engineering (1 ECTS) (from 10/11 to 12/13)
ii) Analysis 1 (9 ECTS) (from 13/14 to 18/19)

Summer Schools

Frontiers in Partial Differential Equations Analysis and Solvers (May 22-25/17)

Analysis and numerics for sharp crack and phase-field fracture

Ph.D. Courses

Ph.D. in “Computational Mathematics and Decision Sciences”, “Design, Modeling, and Simulation in Engineering” and ”Mathematics”

i) Analysis of theoretical models and computational methods for sharp crack and phase field fracture (16/17)
ii) Phase-Field Models for Brittle Fracture (22/23)

Stages

Piece-wise polynomial functions and applications to splines and design (June 13-16/17)

Bezier Curves (June 12-15/18)

Polinomi di MacLaurin e serie di Fourier (February 25-26/21)

Thesis

B.Sc. Thesis in Mathematics

i) I. Luppino: Hausdorff measure: Minkowski content and rectifiable sets (09/10)

ii) C. Simoncini: An introduction to Control Theory (10/11)

iii) E. Cavallotto: Functions of Bounded Variation (10/11)

iv) P. Ferrari: Action of groups and paradoxical sets in Euclidean spaces (11/12)

v) F. Bertagnoglio: Scalar conservation laws (11/12)

vi) T. Dondè: Area and co-area formula for Sobolev functions (12/13)

vii) M. Sessi: Hausdorff measure and fractal sets (12/13)

viii) M. Bariselli: Bochner integrals (14/15)

ix) E. Ciocca Vasino: Problemi di controllo per sistemi di ODE lineari e non-lineari (19/20)

x) B. Bottaro: Funzioni armoniche (20/21)

xi) P. Italiano: Analisi e simulazione della formazione di crettature nei dipinti (21/22)

M.Sc. Thesis in Mathematics

i) M. Bendotti: Linear and non-linear elasticity: existence of minimizers and Euler-Lagrange equations (13/14)

ii) M. Bergamaschi: Obstacle problems: analysis and numerical methods (15/16)

iii) M. Sessi: Gradient flows in Euclidean and metric spaces (16/17)

iv) L. Muffone: H-convergenza ed omogeneizzazione di domini perforati (17/18)

v) S. Altana: Funzioni SBV e discretizzazione del funzionale di Mumford-Shah (a.a. 18/19)

vi) B. Amiotti: Flussi gradiente unilaterali ed applicazioni alla meccanica della frattura (19/20)

vii) S. Sassi: Convergenza di problemi con ostacolo (19/20)

viii) V. Carnevale Baraglia: Flussi gradiente unilaterali ed applicazioni ad un modello phase-field per la frattura fragile (20/21)

ix) E. Maggiorelli: Geological CO_2 storage: an elasto-plastic model for the mechanical response of rock materials (20/21)

Pavia, June 3, 2024