

# CURRICULUM VITAE E STUDIORUM DI ANTONIO MASIELLO

## INTERESSI DI RICERCA:

Analisi Nonlineare, Teoria dei Punti critici, Analisi Geometrica sulle varietà di Lorentz ed applicazioni alla Relatività Generale

## EDUCAZIONE:

Laureato in Matematica nel 1986, presso l'Università degli Studi di Bari con il voto di 110/110 e lode.

P.H.D. in Matematica nel 1992 presso l'Università di Pisa, Supervisor il professor Vieri Benci

## CARRIERA:

Borsista di Dottorato dal 1987 al 1991.

Ricercatore di Analisi Matematica, Novembre 1991--Ottobre 1998.

Professore Associato di Analisi Matematica, Novembre 1998 - febbraio 2002.

Professore Ordinario di Analisi Matematica presso il Politecnico di Bari, marzo 2002 -

## ATTIVITA' ACCADEMICHE:

Direttore del Dipartimento di Matematica del Politecnico di Bari, Gennaio 2004-Settembre 2009.

Membro del senato accademico del Politecnico di Bari, Ottobre 2018 -

## ELENCO DELLE PUBBLICAZIONI

### Monografie

1) **A.MASIELLO**: "*Variational Methods in Lorentzian Geometry*". Pitman Research Notes in Mathematics Vol. **309**. Longman Editions, London 1994.

### Curatela di atti di convegni

2) **B.Casciaro, D. Fortunato, M. Francaviglia, A. MASIELLO** (Editors): "*Recent Developments in General Relativity*", Proceedings of the 13th Italian Conference on General Relativity and Gravitational Physics Monopoli, September 21—25, 1998. Springer Verlag, Milano, 2000.

3) **V. Benci, A. MASIELLO** (Editors): “*Nonlinear Analysis and applications to Physical Sciences*”, Lecture Notes of the summer school at S.Momm'e (Pistoia), May 2—12, 2002. Springer Verlag, Milano, 2004.

#### Articoli di ricerca

4) **A. MASIELLO, L. Pisani**, On the existence of a time-like periodic geodesic for a time-dependent Lorentz metric, *Annali dell' Universit'a di Ferrara Sezione VII Scienze Matematiche* Vol. **XXXVI**, pp. 207-222 (1990).

5) **F.Giannoni, A.MASIELLO**, On the existence of geodesics in stationary Lorentz manifolds with convex boundary, *Journal of Functional Analysis* Vol. **101**, pp. 340-369 (1991).

6) **A.MASIELLO**, Time-like periodic trajectories in stationary Lorentz manifolds, *Nonlinear Analysis, Theory, Methods and Applications* Vol. **19**, pp. 531-545 (1992).

7) **V.Benci, A.MASIELLO**, A Morse index for geodesics in static Lorentz manifolds, *Matematische Annalen* Vol. **293**, pp. 433-442 (1992).

8) **A.MASIELLO**, On the existence of a closed geodesic in stationary Lorentz manifold, *Journal of Differential Equations* Vol. **104**, pp. 48-59 (1993).

9) **F.Giannoni, A.MASIELLO**, Geodesics on Lorentzian manifolds with quasi-convex boundary, *Manuscripta Mathematica* Vol. **78**, pp. 381-396 (1993).

10) **D.Fortunato, F.Giannoni, A.MASIELLO**, Some results on lightlike geodesics on stationary Lorentzian manifolds, *Nonlinear Analysis, Theory, Methods and Applications* Vol. **22**, pp. 1431-1435 (1994).

11) **V.Benci, D.Fortunato, A.MASIELLO**, On the geodesic connectedness of Lorentzian manifolds, *Matematische Zeitschrift* Vol. **217**, pp.73-93 (1994).

12) **A. MASIELLO**, Convex regions in Lorentzian manifolds, *Annali di Matematica Pura ed Applicata (IV)* Vol. **CLXVII**, pp. 299-322 (1994).

13) **D. Fortunato, F. Giannoni, A. MASIELLO**, A Fermat principle for stationary space-times with applications to light rays, *Journal of Geometry and physics* Vol. **15**, pp. 159-188 (1995).

14) **F.Giannoni, A. MASIELLO** Geodesics on product Lorentzian manifolds, *Annales de l'Institut Henri Poincarè, Analyse Nonlinèaire*, Vol. **12**, pp. 27-60 (1995).

15) **F. GIANNONI, A. MASIELLO**, On a variational theory of light rays on Lorentzian manifolds, *Rendiconti Accademia Nazionale dei Lincei Serie IX* Vol. **6**, pp. 155-159 (1995).

- 16) **A. MASIELLO**, On the existence of a timelike trajectory for a Lorentzian metric,  
*Proceedings of the Royal Society of Edinburgh* Vol. **125 A**, pp. 807-815 (1995).
- 17) **F. Giannoni, A. MASIELLO**, Morse Relations for geodesics on stationary Lorentzian manifolds with boundary,  
*Topological Methods in Nonlinear Analysis* Vol. **6**, pp. 1-30 (1995).
- 18) **R. Bartolo, A. MASIELLO**, On the existence of infinitely many trajectories for a class of Lorentzian manifolds like Schwarzschild and Reissner-Nordström space-times,  
*Journal of Mathematical Analysis and Applications* Vol. **199**, pp. 14-38 (1996).
- 19) **A. MASIELLO, L. Pisani**, Asymptotically linear elliptic problems at resonance,  
*Annali di Matematica Pura ed Applicata (IV)* Vol. **CLXXI**, pp. 1-13 (1996).
- 20) **F. Giannoni, A. MASIELLO**, On a Fermat principle in General Relativity. A Morse theory for light rays,  
*General Relativity and Gravitation* Vol. **28**, pp. 855-897 (1996).
- 21) **F. Giannoni, A. MASIELLO, P. Piccione**, A variational theory for light rays in stably causal Lorentzian manifolds. Existence and regularity results,  
*Communications in Mathematical Physics* Vol. **187**, pp. 375--415 (1997).
- 22) **R. Bartolo, A. MASIELLO**, Morse Relations for second order Lagrangian systems on Riemannian manifolds with convex boundary,  
*Advances in Differential Equations* Vol. **2**, pp. 593--618 (1997).
- 23) **F. Giannoni, A. MASIELLO, P. Piccione**, On a Variational Theory for Light Rays on Stably Causal Lorentzian Manifolds,  
*Comptes Rendous de l'Academie des Science Paris* Vol. **324**, Series I, pp. 1093--1098 (1997).
- 24) **F. Giannoni, A. MASIELLO**, On a Fermat principle in General Relativity. A Ljusternik-Schnirelmann theory for light rays,  
*Annali di Matematica Pura ed applicata (IV)* Vol. **CLXXIV**, pp. 161--207 (1998).
- 25) **A. MASIELLO, P. Piccione**, Shortening null geodesics in Lorentzian manifolds. Applications to closed light rays,  
*Differential Geometry and its Applications* Vol. **8**, pp. 47-70 (1998).
- 26) **F. Giannoni, A. MASIELLO, P. Piccione**, A Morse Theory for Light Rays on Stably Causal Lorentzian Manifolds,  
*Annales de l' Institut Henri Poincarè, Physique Theorique* Vol. **69**, pp. 359--412 (1998).
- 27) **F. Giannoni, A. MASIELLO, P. Piccione**, A Timelike Extension of Fermat's Principle in General Relativity and Applications,  
*Calculus of Variations and P.D.E.* Vol. **6**, pp. 263—283 (1998).
- 28) **V. Benci, F. Giannoni, A. MASIELLO**, Some properties of the spectral flow in semiriemannian geometry,  
*Journal of Geometry and Physics* Vol. **27**, pp. 267--280 (1998).

- 29) **A.M. Candela, F. Giannoni, A. MASIELLO**, Multiple critical points for indefinite functionals and applications,  
*Journal of Differential Equations* Vol. **155**, pp. 203--230 (1999).
- 30) **F. Giannoni, A. MASIELLO, P. Piccione**, Convexity and the finiteness of the number of geodesic. Applications to the multiple image effect,  
*Classical and Quantum Gravity* Vol. **16**, pp. 731--748 (1999).
- 31) **V. Benci, D. Fortunato, A. MASIELLO, L. Pisani**, Solitons and the electromagnetic field,  
*Mathematische Zeitschrift* Vol. **232**, pp. 73--102 (1999).
- 32) **F. Giannoni, A. MASIELLO, P. Piccione**, A Morse Theory for massive particles and photons in General Relativity,  
*Journal of Geometry and Physics* Vol. **35**, pp. 1--34 (2000).
- 33) **A.M. Candela, A. MASIELLO, A. Salvatore**, Existence and multiplicity of normal geodesics in Lorentzian manifolds,  
*Journal of Geometric Analysis* Vol. **10**, pp. 623--652 (2000).
- 34) **F. Giannoni, A. MASIELLO, P. Piccione**, On the finiteness of light rays between a source and an observer on conformally stationary space--times,  
*General Relativity and Gravitation* Vol. **33**, pp. 491--514 (2001).
- 35) **F. Giannoni, A. MASIELLO, P. Piccione, D. Tausk**, A generalized index Theorem for Morse--Sturm systems and applications to semiriemannian Geometry,  
*The Asian Journal of Mathematics* Vol. **5**, pp. 441--472 (2001).
- 36) **F. Giannoni, A. MASIELLO, P. Piccione**, The Fermat principle in General Relativity and applications,  
*Journal of Mathematical Physics* Vol. **43**, pp. 563--596 (2002).
- 37) **E. Caponio, A. MASIELLO**, Trajectories of charged particles in a region of a stationary spacetime,  
*Classical and Quantum Gravity* Vol. **19**, pp. 2229--2256 (2002).
- 38) **E. Caponio, A. MASIELLO**, Trajectories for relativistic particles under the action of an electromagnetic force in a stationary space--time,  
*Nonlinear Analysis, Theory, Methods and Applications* Nonlinear Analysis T.M.A. **50**, pp 71--89 (2002).
- 39) **A. MASIELLO, P. Piccione**, On the spectral flow on Lorentzian manifolds,  
*Annali di Matematica Pura ed Applicata* Vol. **182**, pp. 81--101 (2003).
- 40) **E. Caponio, A. MASIELLO, P. Piccione** Some global properties of static spacetimes,  
*Mathematische Zeitschrift* Vol. **244**, pp. 457--468 (2003).
- 41) **A. Abbondandolo, V. Benci, D. Fortunato, A. MASIELLO**, On the Morse inequalities for geodesics on Lorentzian manifolds,  
*Mathematical Research Letters* Vol. **10**, pp. 435--445 (2003).

- 42) **A. MASIELLO, P. Piccione**, On the number of solutions for the two--point value problem on Riemannian manifolds,  
*Journal of Geometry and Physics* Vol. **49**, pp. 67--88 (2004).
- 43) **E. Caponio, A. MASIELLO, P. Piccione**, Maslov Index and Morse Theory for the relativistic Lorentz force equation,  
*Manuscripta Mathematica* Vol. **113**, pp. 471--506 (2004).
- 44) **E. Caponio, A. MASIELLO**, The Avez--Seifert Theorem for the relativistic Lorentz equation,  
*Journal of Mathematical Physics* Vol. **45**, pp. 4134--4140 (2004).
- 45) **E. Caponio, A. MASIELLO**, Causal properties of Kaluza--Klein metrics,  
*Applied Mathematical Letters* Vol. **17**, pp. 1371--1374 (2004).
- 46) **A. MASIELLO**, On the geodesic connectedness of a class of Lorentzian manifolds with boundary,  
*Advanced Nonlinear studies* Vol. **6**, pp. 287--308 (2006).
- 47) **R. Giambò, F. Giannoni, A. MASIELLO**, Functional regularity properties for light rays in General Relativity,  
*Journal of Mathematical Physics* Vol. **50**, 072501 (2009).
- 48) **A. MASIELLO**, An alternative variational principle for geodesics of a Randers metric,  
*Advanced Nonlinear Studies* Vol. **9**, 783--801 (2009).
- 49) **M.A. Javaloyes, A. MASIELLO, P. Piccione**, Pseudo focal points along Lorentzian geodesics and Morse index,  
*Advanced Nonlinear Studies* Vol. **10**, pp. 53--82 (2010).
- 50) **E. Caponio, M.A. Javaloyes, A. MASIELLO**, Finsler geodesics in the presence of a convex function and their applications,  
*Journal of Physics A: Mathematical and Theoretical* Vol. **43**, 135207 (2010).
- 51) **E. Caponio, M.A. Javaloyes, A. MASIELLO**, Morse Theory of causal geodesics in a stationary spacetime via Morse Theory of geodesics of a Finsler metric,  
*Annales de l'Institut Henri Poincaré, Analyse Nonlineaire* Vol. **27**, pp. 857-876 (2010).
- 52) **E. Caponio, M.A. Javaloyes, A. MASIELLO**, On the energy functional on Finsler manifolds and applications to stationary spacetimes,  
*Mathematische Annalen* Vol. **351**, pp. 365-392 (2011).
- 53) **E. Caponio, M.A. Javaloyes, A. MASIELLO**, Addendum to "Morse Theory of causal geodesics in a stationary spacetime via Morse Theory of geodesics of a Finsler metric" [Ann. I. H. Poincaré - AN 27 (3) (2010) 857-876],  
*Annales de l'Institut Henri Poincaré, Analyse Nonlineaire* Vol. **30**, pp. 961--968 (2013).

**Lavori pubblicati su atti di convegni**

- 54) **V. Benci, D. Fortunato, A. MASIELLO**, A Morse Theory for geodesics in Lorentzian manifolds, pubblicato su *Proceedings of the International Conference at Nankai Institute of Mathematics "Nonlinear Analysis and Microlocal Analysis"*, Nankai, August 1991 (Ed.: K. C. Chang, Y. M. Huang, T. T. Li), pp. 1--19. World Scientific, Singapore 1993.
- 55) **A. MASIELLO**, Some results on the geodesic connectedness of Lorentzian manifolds, pubblicato su *Variational Methods in Nonlinear Analysis*, Erice, May 1992 (Ed.: A. Ambrosetti, K.C.Chang), pp. 221—244 Gordon and Breach Publishers, New York 1995.
- 56) **D.Fortunato, A.MASIELLO**, Fermat principles in General Relativity and existence of light rays on Lorentzian manifolds, pubblicato su *Proceedings of Workshop on Variational and Local Methods in the study of Hamiltonian systems*, Trieste 1994 (Ed.: A. Ambrosetti, G.F. Dell'Antonio), pp. 34--64. World Scientific, Singapore, 1995.
- 57) **A.MASIELLO**, Critical point theory and global Lorentzian Geometry, pubblicato su *Proceedings of the Second World Congress of Nonlinear Analysts*, Athens, July 1996. *Nonlinear Analysis T.M.A.* Vol. **30**, pp. 605--616 (1997),
- 58) **F.Giannoni, A.MASIELLO, P.Piccione**, The Fermat principle in General Relativity and the gravitational lensing effect, pubblicato su *On Recent developments in Theoretical and Experimental General Relativity, Gravitation and Relativistic Field Theories*, Proceedings of the 8th Marcel Grossmann meeting, The Hebrew University of Jerusalem, 22--27 June 1997 (Editori: T. Piran, R. Ruffini), pp. 1488--1490. World Scientific, Singapore, 1999.
- 59) **A. MASIELLO**, Applications of Calculus of Variations to General Relativity, pubblicato su *Recent developments in General Relativity*, Proceedings of the XIII Italian Congress of General Relativity, Monopoli 21--25 settembre 1998 (Editori: B.Casciaro, D. Fortunato, M. Francaviglia, A. Masiello), pp. 173--195. Springer Verlag, Milano, 2000.
- 60) **E. Caponio, A.MASIELLO**, Trajectories for relativistic particles in an electromagnetic field, pubblicato su *Recent developments in General Relativity, Genoa 2000*, Proceedings of the XIV Italian Conference in General Relativity and Gravitation Physics, Genova 18--22 settembre 2000, (Editori: R.Cianci, R.Collina, M.Francaviglia, P.Fr'e), pp. 369--373. Springer Verlag, Milano, 2002.
- 61) **A.MASIELLO**, Geodesics on Lorentzian manifolds: a variational approach, in Proceedings of the conference *Lorentzian Geometry--Benalmedena 2001*, Benalmedena (Malaga), 14-16 novembre 2001 (Editori:M.A. Canadas-Pinedas, M. Gutierrez, A. Romero). Publication de la Real Sociedad Matematica Espanola Vol. **5**, pp. 183--203, Madrid 2003.
- 62) **A.MASIELLO**, Some variational problem in semiriemannian geometry, in *Analytical and Numerical Approaches to Mathematical Relativity*, Proceedings of the Workshop Mathematical Relativity, New ideas and Developments, Bad Honnef, 1-5 March 2004, L. Frauendiener, D. Giulini. V.Perlick (Eds.), Lecture Notes in Physics **692**, pp. 51--77, Springer, Heidelberg 2006.
- 63) **A.MASIELLO**, Variational properties of the relativistic Lorentz equation, in *Recent Developments in Gravitational Physics: Proceedings of the 15th SIGRAV Conference on General Relativity and Gravitational Physics*, Villa Mondragone, Monte Porzio Catone, Rome, Italy, 9-12 September 2002 I.Ciufolini, E.Coccia M.Colpi, V.Gorini, R.Peron (Editors). Institute of Physics Conference Series 176, pp. 171--180, Taylor and Francis, New York 2006.