Curriculum vitae

Eugenio Massa

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1 Contact information

Name: Eugenio Massa
Address : Departamento de Matemática, Instituto de Ciências Matemáticas e de Computação, Caixa Postal 668, 13560-970 São Carlos - SP, Brazil
e-mail: eugenio@icmc.usp.br   or   eug.massa@gmail.com
Telephone: +55 16 3373-6635 ,   **FAX:** +55 16 3373-9650
url: http://conteudo.icmc.usp.br/pessoas/eugenio/

2 Education

- **Laurea in Ingegneria Aerospaziale** (aerospace engineer degree), "100/100 cum laude", at "Politecnico di Milano" (Italy), in June 1999.

- **PhD in Mathematics**.
  at "Università degli Studi di Milano" (Italy), from November 1999 to October 2003.
  Advisor : Prof. Bernhard Ruf
  Theses: "On the Fučík spectrum and superlinear elliptic equations".

- **Pos-doc** at UNICAMP (Brazil) form april 2004 to february 2006.
  Supervisor: Prof. D. G. de Figueiredo (UNICAMP). Grant FAPESP #03/13839-7

- **Livre docência** at "Universidade de São Paulo" (Brazil) in May 2010.
  Dissertation "Multiplicidade de soluções para certos problemas elípticos superlineares".

3 Academic Positions

3.1 Present position

- Associate Professor at Departamento de Matemática, Instituto de Ciências Matemáticas e de Computação, Universidade de São Paulo (USP), from 2006 (Associate from 2010).

3.2   Previous positions

- Contract assistant professor at Politecnico di Milano from 2000 to 2004.

4   Visiting positions

- Universidad de Santiago de Chile (Chile), from July to Dezember 2008, Grant from "Vicerrectoría de Investigación y Desarrollo" and "Departamento de Investigaciones Científicas y Tecnológicas (DICYT)" - USACH

- Universidad Técnica Federico Santa Maria (Chile), from July 2016 to January 2017.

- Universidad de Granada (Spain) from January to july 2020.

5   Papers

- 1) E. Massa, *On a variational characterization of the Fučík spectrum of the Laplacian and a superlinear Sturm-Liouville equation*, Proc. Roy. Soc. Edinburgh Sect. A **134** (2004), no. 3, 557–577.

- 2) E. Massa, *On a variational characterization of a part of the Fučík spectrum and a superlinear equation for the Neumann p-Laplacian in dimension one*, Adv. Differential Equations **9** (2004), no. 5-6, 699–720.

- 3) E. Massa, *Superlinear equations and a uniform anti-maximum principle for the multi-Laplacian operator*, Electron. J. Differential Equations (2004), No. 97, 19 pp. (electronic).

- 4) E. Massa, *An existence result for a linear-superlinear elliptic system with Neumann boundary conditions*, J. Math. Anal. Appl. **322** (2006), no. 1, 403–419.

- 5) E. Massa and B. Ruf, *On the Fučík spectrum for elliptic systems*, Topol. Methods Nonlinear Anal. **27** (2006), no. 2, 195–228.

- 6) E. Massa, *Multiplicity results for a superlinear elliptic system with partial interference with the spectrum*, Nonlinear Anal. **67** (2007), no. 1, 295–306.

- 7) E. Massa and B. Ruf, *A global characterization of the Fučík spectrum for a system of ordinary differential equations*, J. Differential Equations **234** (2007), no. 1, 311–336.

- 8) F. O. de Paiva and E. Massa, *Multiple solutions for some elliptic equations with a nonlinearity concave at the origin*, Nonlinear Anal. **66** (2007), no. 12, 2940–2946.

- 9) F. O. de Paiva and E. Massa, *Semilinear elliptic problems near resonance with a non-principal eigenvalue*, J. Math. Anal. Appl. **342** (2008), no. 1, 638–650.

- 10) E. Massa and B. Ruf, *On the Fučík spectrum of the Laplacian on a torus*. J. Functional Analysis, **256** (2009), no. 5, 1432-1452.

- 11) L. Iturriaga, E. Massa, J. Sanchez and P. Ubilla, *Positive solutions for the $p-$Laplacian with a nonlinear term with zeros*, J. Differential Equations. **248** (2010), no. 2, 309–327.

- 12) L. Iturriaga, S. Lorca and E. Massa, *Positive solutions for the p-Laplacian involving critical and supercritical nonlinearities with zeros*, Ann. Inst. H. Poincaré Anal. Non Linéaire 27 (2010), no. 2, 763–771.

- 13) E. Massa and P. Ubilla, *Superlinear elliptic problems with sign changing coefficients*, Comm. Contemp. Math. 14 (2012), no 1, 1250001-1–1250001-21.

- 14) L. Iturriaga, E. Massa, J. Sanchez and P. Ubilla, *Positive solutions for an elliptic equation in an annulus with a superlinear nonlinearity with zeros*, Mathematische Nachrichten. 287 (2014), no. 10, 1131-1141. doi:10.1002/mana201100285

- 15) E. Massa and R. A. Rossato, *Multiple solutions for an elliptic system near resonance*, J. Math. Anal. Appl. 420 (2014), no. 2, 1228-1250. doi:10.1016/j.jmaa.2014.06.043

- 16) L. Iturriaga, S. Lorca and E. Massa, *Multiple positive solutions for the m-Laplacian and a nonlinearity with many zeros*, Differential Integral Equations 30 (2017) 1-2, pp. 145-159. url:http://projecteuclid.org/euclid.die/1484881224

- 17) E. Massa, R. A. Rossato *Three solutions for an elliptic system near resonance with the principal eigenvalue*, Differential Integral Equations 30 (2017) 3-4, pp. 207-230. url:http://projecteuclid.org/euclid.die/1487386823

- 18) E. Massa, A. P. Peron and A. C. Piantella *Estimates on the derivatives and analyticity of positive definite functions on $\mathbb{R}^m$*. Analysis Mathematica (2017) 43; 89. doi:10.1007/s10476-017-0105-9

- 19) E. Massa, A. P. Peron and E. Porcu, *Positive definite functions on complex spheres and their walks through dimensions*. SIGMA 13 (2017), 088, 16 pages. doi:10.3842/SIGMA.2017.088. arXiv:1704.01237 [math.CA]

- 20) L. Iturriaga, and E. Massa, *On necessary conditions for the Comparison Principle and the Sub- and Supersolutions Method for the stationary Kirchhoff Equation.* J. of Math. Phys. 59, 011506 (2018). doi:10.1063/1.5021685, arXiv:1710.11061v1 [math.AP]. Chosen as "Editor's Pick" for 2018 in J. of Math. Phys.

- 21) M. Calanchi, E. Massa and B. Ruf *Weighted Trudinger-Moser inequalities and associated Liouville type equations.* Proc. Amer. Math. Soc. 146 (2018) no. 12, pp. 5243-5256. doi:10.1090/proc/14189

- 22) L. Iturriaga, and E. Massa, *Existence, nonexistence and multiplicity of positive solutions for the poly-Laplacian and nonlinearities with zeros.* Discrete & Contin. Dyn. Syst. 38 (2018), pp. 3831-3850. doi:10.3934/dcds.2018166

- 23) M. H. Castro, E. Massa and A. P. Peron *Characterization of Strict Positive Definiteness on products of complex spheres*, Positivity 23 (2019), pp 853-874. doi:10.1007/s11117-018-00641-5. arXiv:1803.06264v1 [math.CA]

- 24) C. Berg, E. Massa, A.P. Peron, *A family of entire functions connecting the Bessel function J_1 and the Lambert W function*, Constr. Approx. 53, 121?154 (2021). doi:10.1007/s00365-020-09499-x

- 25) L. Iturriaga and E. Massa, *Sobolev versus Hölder local minimizers in degenerate Kirchhoff type problems*, Journal of Differential Equations 269 (2020) 5, pp. 4381-4405

- 26) G. M. Figueiredo, E. Massa and J. A. Santos, *Existence of positive solutions for a class of semipositone problems with Kirchhoff operator*, Annales Fennici Mathematici, 46 (2021) 2, pp. 655-666.

- 27) E. Massa, *Concave-convex behavior for a Kirchhoff type equation with degenerate nonautonomous coefficient*, Nonlinear Differ. Equ. Appl. (NoDEA) 28, 58 (2021). https://doi.org/10.1007/s00030-021-00718-3.

- 28) J. Abrantes Santos, C. O. Alves, E. Massa and *A nonsmooth variational approach to semipositone quasilinear problems in R^n*, J. Math. Anal. Appl. 527 (2023) 127432 https://doi.org/10.1016/j.jmaa.2023.127432

6 Presentations in scientific events

- 23 to 27 of January 2006: **"II Escola Brasileira de Equações Diferenciais"**, Rio de Janeiro - Brazil. Talk: *"Um resultado de existência para um sistema elíptico linear-superlinear com condições de Neumann".*

- 11 to 15 of September 2006: **"VI Workshop on Non-linear Differential Equations and Applications"**, Como - Italy. Talk: *"Multiplicity Results for a Superlinear Elliptic System with Partial Interference with the Spectrum".*

- 15 to 16 of March 2007: **"III Mini-Simpósio: Métodos Topológicos em Equações Diferenciais"**, Campinas, Brazil. Talk: *"Sobre o Espectro de Fucik para sistemas".*

- 28 of January to 1 of February 2008: **"ICMC Summer Meeting in Differential Equations - 2008 Chapter"**, São Carlos - Brazil. Talk: *"Semilinear elliptic problems near resonance with a non-principal eigenvalue"*.

- 15 to 19 of September 2008: **"Workshop in nonlinear differential equations"**, Rio de Janeiro - Brazil. Talk: *"Semilinear elliptic problems near resonance with a non-principal eigenvalue"*.

- 24 to 28 of November 2008: **"III workshop internacional de matemática"**, Cusco - Peru. Talk: *"El espectro de Fucik y sus propriedades"*.

- 3 to 4 of December 2008: **"II Workshop Iberoamericano de Matemática Aplicada"**, Chillan - Chile. Talk: *"El espectro de Fucik para el Laplaciano en un toro"*.

- 13 to 16 of October 2009: **"IV Workshop Internacional en Matemática"**, Arequipa - Peru. Talk: *"Métodos Variacionales Para Problemas Elípticos y una Aplicación en un Sistema"*.

- 28 to 30 of October 2009: **"Workshop em EDPs Elípticas - Um encontro de quatro gerações"**, Campinas - Brazil. Talk: *"Um problema de tipo Ambrosetti-Prodi para um sistema Hamiltoniano"*.

- 4 a 6 of August 2010: **"XX Congreso de Matemática Capricornio, COMCA 2010"**, Arica - Chile. Talk: *"Positive solutions of the p-Laplacian involving a superlinear nonlinearity with zeros"*.

- 7 to 9 of February 2011 **"ICMC summer meeting on differential equations - Chapter 2011"**, São Carlos - Brazil. Talk: *"Multiplicity of solutions for the p-Laplacian involving a nonlinearity with zeros"*.

- 22 to 26 of August 2011 **"IV EBED - Escola Brasileira de Equações Diferenciais"**, João Pessoa- Brazil. Talk: *"Multiplicidade de soluções para o p-Laplaciano e não linearidades com zeros"*.

- 3 to 7 of February 2014 **"ICMC Summer Meeting on Differential Equations 2014 Chapter - Celebrating the 80th birthday of Djairo Guedes de Figueiredo"**,São Carlos - Brazil. Talk: *"On the Fucik Spectrum"*.

- 14 to 18 of September 2015: **"RISM 4: Nonlinear Phenomena in Mathematics and Economics"**, Varese - Italy. Talk: *"Multiple solutions for an elliptic system near resonance"*.

- 4 to 8 of September 2017: **"X Workshop on Nonlinear Differential Equations"**, Brasília - Brazil. Talk: *"Existence, nonexistence and multiplicity of positive solutions for the poly-Laplacian and nonlinearities with zeros"*.

- 20 to 24 of February 2018: **"VII WENLU - Workshop on Nolinear PDE's and Geometric Analysis"**, João Pessoa - Brazil. Talk: *"Blow up of solutions of semilinear heat equations with almost hénon-critical exponent"*

- 23 to 27 of July 2018: **"ICM 2018 Satellite Conference on Nonlinear Partial Differential Equations"**, Fortaleza - Brazil. Talk: *"Weighted Trudinger-Moser inequalities and associated Liouville type equations"*

- 10 to 13 of June 2019: **"II IMDE - Conference Amazon-Andalusia on PDEs"**, Belém - Brazil. Talk: *"On the validity of some classical techniques for the stationary Kirchhoff Equation"*

- July 29th to August 2nd 2019: **"XI BRAZILIAN-ITALIAN WORKSHOP IN NONLINEAR DIFFERENTIAL EQUATIONS"**, Varese - Italy. Talk: *"On the validity of some classical techniques for the stationary Kirchhoff Equation"*

- 24 to 26 of November 2021: **"XI semana da matemática"**, UFCG. Talk: *"Comportamento côncavo-convexo" para Equações de tipo Kirchhoff com coeficiente degenerado"*.

7 Students

7.0.1 PhD students

- **Student: Rafael Antônio Rossato**, "Sistemas elípticos de tipo hamiltoniano perto da ressonância", concluded in november 2014. Grant FAPESP #2010/06411-4.

7.0.2 Master students

- **Student: Rafael Antônio Rossato**, "Espectro de Fucik e equações elípticas com não linearidades de salto", concluded in april 2010. Grant FAPESP #2007/06106-4.

- **Student: Maycon Sullivan Santos Araujo**., "Equações elípticas com não linearidades críticas e perturbações de ordem inferior", concluded june 2015.

- **Student: Rodrigo Lima Almeida**., "Novas caracterizações variacionais do espectro de Fucik", in progress (2023).

7.0.3 Undergraduate students supervisions

- **Student: Artur Lustre Gonçalves**."Análise na reta e equações diferenciais" from april 2009 to july 2011, Grant PICME.

- **Student: Guilherme Salvador Vieira**. "Uma Introdução às Equações da Aerodinâmica" from august 2010 to november 2012, Grant FAPESP #2010/12870-1.

- **Student: Pedro Henrique Carvalho Fontana** . "Estudo de EDOs para modelagem de problemas físicos relacionados a problemas aerodinâmicos" from august 2018 to august 2019.

- **Student: Rafael de Oliveira Moura** . "Introdução às equações diferenciais parciais e Aplicações na Física" from march to december 2019.

- **Student: Lucas Soares Pereira** . "Introdução às equações diferenciais parciais elípticas" from february 2021 to february 2022.

- **Student: Rafael Aparecido Rodrigues da Paz** . "Introdução às equações diferenciais parciais e Aplicações na Física" from august 2021.

- **Student: Nicolas Oliveira Rossoni** . "Equações diferenciais ordinárias e parciais com aplicações na Física" from august 2022.

8   Peer-review

Acted as pear reviewer for the following journals:

- *Applied Mathematics Letters.*

- *Proceedings of the Edinburgh Mathematical Society.*

- *Electronic Journal of Differential Equations.*

- *Revista Colombiana de Matemáticas.*

- *Journal of Mathematical Analysis and Applications.*

- *Milan Journal of Mathematics.*

- *Advances in Nonlinear Analysis.*

- *Discrete and Continuous Dynamical Systems.*

- *Mathematische Nachrichten.*

- *Mediterranean Journal of Mathematics.*

- *Acta Mathematica Scientia.*

- *AIMS Mathematics.*

- *Nonlinear Analysis: Real World Applications.*

- *Zeitschrift für Angewandte Mathematik und Physik.*

Reviewer for the Americam Mathematical Society - Mathematical Reviews, since February 2020.

Reviewer for Zentralblatt MATH (zbMATH Open), since May 2021.

9 Teaching

9.1 Undergraduate teaching

Regularly teaches in undergraduate courses at University of São Paulo (São Carlos), in the following topics:

- Tópicos de Matemática Elementar (Topics in elementary mathematics),

- Cálculo 1,2,3,4 (Calculus 1,2,3,4),

- Álgebra Linear (Linear algebra),

- Matemática para Arquitetura (Mathematics for architecture),

- Matemática Discreta (Discrete mathematics),

- Equações diferenciais parciais (Partial differential equations)

9.2 Postgraduate teaching

Member of the advisors team for the Postgraduate Program in Mathematics at ICMC (USP) since 2007.

Ministered the following courses at ICMC (USP):

- Medida e Integração (Measure and integration),

- Cálculo Avançado (Advanced calculus),

- Tópicos em Análise não Linear e Aplicações às Equações Diferenciais (Topics on non linear analysis and applications to differential equations),

- Equações Diferenciais Parciais (Partial differential equations),

- Equações Diferenciais Parciais elípticas (Elliptic partial differential equations),

- Equações Diferenciais Ordinárias (Ordinary differential equations),

- Análise funcional (Functional analysis).

- Métodos Variacionais (Variational Methods).

10   Administration

Acted as member of several commissions at ICMC (USP):

- mathematic department council,

- institute council (Congregação),

- institute technical and administrative council (CTA),

- coordinating council of the Postgraduate Program in Mathematics,

- coordinating council of several degree courses.

11   Organization

- Member of the organizing committee of the "Summer Program in Mathematics" of ICMC (USP), editions 2009, 2010 and 2011.

- Member of the organizing committee of the "Mini-Simpósio de graduação" (small meeting with poster expositions at degree level) of ICMC (USP), editions 2009, 2010 and 2011.

- Coordinator of the "Summer Program in Mathematics" of ICMC (USP), 2011 edition.