Curriculum Vitae of Teresa D'APRILE

Personal Informations

- Born in Gioia del Colle (Bari) on July 16th 1975.
- Nationality: Italian.
- Married with one child.
- Address: Dipartimento di Matematica, Università di Roma "Tor Vergata", via della Ricerca Scientifica 1, 00133 Roma (Italy).
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Education

- University Degree (Laurea) in Mathematics with result 110/110 *cum laude* at University of Bari, October 28th 1999. Title of the thesis: *Problemi ellittici non lineari per l'operatore p-Laplaciano*. Supervisor Prof. Enrico Jannelli.
- Ph.D degree in Mathematics with result 70/70 *cum laude* at Scuola Normale Superiore (Pisa), July 24th 2002. Title of the thesis: *Semiclassical States for Some Classes of Nonlinear Schrödinger Equations*. Supervisors: Prof. Vieri Benci, Prof. Marino Badiale.

Academic Positions

- October 2001 – October 2005, researcher in Mathematical Analysis at University of Bari.
- November 2005 – December 2015, researcher in Mathematical Analysis at University of Roma "Tor Vergata".
- January 2016 – present, associate professor in Mathematical Analysis at University of Roma "Tor Vergata".

National Scientific Habilitation

- Habilitation to associate professorship (December 30, 2013).
- Habilitation to full professorship (November 11, 2014).

Citations

MathSciNet September 19th, 2016: 590 citations by 260 authors.

Publications

Papers in international journals

[1] T. D'Aprile. *Behaviour of symmetric solutions of a nonlinear elliptic field equation in the semi-classical limit: concentration around a circle*, Electron. J. Differential Equations **2000** (2000), 1–40.

[2] M. Badiale, V. Benci, T. D'Aprile. *Semiclassical limit for a quasilinear elliptic field equation: one-peak and multi-peak solutions*, Adv. Differential Equations **6** (2001), 385–418.

[3] M. Badiale, V. Benci, T. D'Aprile. *Existence, multiplicity and concentration of bound states for a quasilinear elliptic field equation*, Calc. Var. Partial Differential Equations **12** (2001), 223–258.

[4] T. D'Aprile. *Existence and concentration of local mountain passes for a nonlinear elliptic field equation in the semi-classical limit*, Topol. Methods Nonlinear Anal. **17** (2001), 239–275.

[5] T. D'Aprile. *Some results on a nonlinear elliptic field equation involving the p-Laplacian*, Proceedings of the Third World Congress of Nonlinear Analysts, Part 9 (Catania, 2000). Nonlinear Anal. **47** (2001), 5979–5989.

[6] M. Badiale, T. D'Aprile. *Concentration around a sphere for a singularly perturbed Schrödinger equation*, Nonlinear Anal. Ser. A: Theory Methods, **49** (2002), 947–985.

[7] V. Benci, T. D'Aprile. *The semiclassical limit of the nonlinear Schrödinger equation in a radial potential*, J. Differential Equations **184** (2002), 109–138.

[8] T. D'Aprile. *On a class of solutions with non-vanishing angular momentum for nonlinear Schrödinger equations*, Differential Integral Equations **16** (2003), 349–384.

[9] T. D'Aprile. *Some existence and concentration results for nonlinear Schrödinger equations*, Commun. Pure Appl. Anal. **1** (2002), 457–474.

[10] T. D'Aprile. *Semiclassical states for a class of nonlinear elliptic field equations*, Asymptot. Anal. **37** (2004), 109–141.

[11] T. D'Aprile, D. Mugnai. *Solitary waves for the nonlinear Klein-Gordon-Maxwell and Schrödinger-Maxwell equations*, Proc. Roy. Soc. Edinburgh Sect. A. **134** (2004), 893–906.

[12] T. D'Aprile, D. Mugnai. *Non-existence results for the coupled Klein-Gordon-Maxwell equations*, Adv. Nonlinear Studies **4** (2004), 307–322.

[13] T. D'Aprile, J. Wei. *On bound states concentrating on spheres for the Maxwell–Schrödinger equation*, SIAM J. Math. Anal. **37** (2005), 321–342.

[14] T. D'Aprile, J. Wei. *Standing waves in the Maxwell–Schrödinger equation and an optimal configuration problem*, Calc. Var. Partial Differential Equations **25** (2006), 105–137.

[15] T. D'Aprile, J. Wei. *Boundary concentration in radial solutions to a system of semilinear elliptic equations*, J. Differential Equations **226** (2006), 269–294.

[16] T. D'Aprile. *Solitary charged waves interacting with the electrostatic field*, J. Math. Anal. Appl. **317** (2006), 526–549.

[17] T. D'Aprile. *An eigenvalue semiclassical problem for the Schrödinger operator with an electrostatic field*, Topol. Methods Nonlinear Anal. **27** (2006), 149–175.

[18] T. D'Aprile, J. Wei. *Boundary layers for a coupled elliptic system*, J. London Math. Soc. **74** (2006), 415–440.

[19] T. D'Aprile, J. Wei. *Locating the boundary peaks of least-energy solutions to a singularly perturbed Dirichlet problem*, Ann. Sc. Norm. Super. Pisa Cl. Sci. (5) **5** (2006), 219-259.

[20] A. Azzollini, V. Benci, T. D'Aprile, D. Fortunato. *Existence of static solutions of the semilinear Maxwell equations*, Ric. Mat. **55** (2006), 283–297.

[21] T. D'Aprile. *Semiclassical states for the nonlinear Schrödinger equation with the electromagnetic field*, NoDEA Nonlinear Differential Equations Appl. **13** (2007), 655–681.

[22] T. D'Aprile, J. Wei. *Clustered solutions around harmonic centers to a coupled elliptic system*, Ann. Inst. H. Poincaré Anal. Non Linéaire **24** (2007), 605–628.

[23] T. D'Aprile, A. Pistoia. *On the number of sign-changing solutions of a semiclassical nonlinear Schrödinger equation*, Adv. Differential Equations **12** (2007), 737–758.

[24] T. D'Aprile, A. Pistoia. *Existence, multiplicity and profile of sign-changing clustered solutions of a semiclassical nonlinear Schrödinger equation*, Ann. Inst. H. Poincaré Anal. Non Linéaire **26** (2009), 1423–1451.

[25] T. D'Aprile, A. Pistoia. *Nodal clustered solutions for some singularly perturbed Neumann problems*, Commun. Partial Differential Equations **35** (2010), 1355–1401.

[26] T. D'Aprile, A. Pistoia. *On the existence of some new positive interior spike solutions to a semilinear Neumann problem*, J. Differential Equations **248** (2010), 556–573.

[27] T. D'Aprile, D. Ruiz. *Positive and sign-changing clusters around saddle points of the potential for nonlinear elliptic problems*, Math. Z. **268** (2011), 605–634.

[28] T. D'Aprile, G. Siciliano. *Magnetostatic solutions for a semilinear perturbation of the Maxwell equations*, Differential Integral Equations **16** (2011), 435–466.

[29] T. D'Aprile, A. Pistoia. *Nodal solutions for some singularly perturbed Dirichlet problems*, Trans. Amer. Math. Soc. **363** (2011), 3601–3620.

[30] T. D'Aprile. *Solutions with many mixed positive and negative interior spikes for a semilinear Neumann problem*, Calc. Var. Partial Differential Equations **41** (2011), 435–454.

[31] T. Bartsch, T. D'Aprile, A. Pistoia. *Multi-bubble nodal solutions for slightly subcritical elliptic problems in domains with symmetries,* Ann. Inst. H. Poincaré Anal. Non Linéaire **30** (2013), 1027–1047.

[32] T. D'Aprile. *Multiple blow-up solutions for the Liouville equation with singular data*, Commun. Partial Differential Equations **38** (2013), 1409–1436.

[33] T. Bartsch, T. D'Aprile, A. Pistoia. *On the profile of sign changing solutions of an almost critical problem in the ball*, Bull. Lond. Math. Soc. **45** (2013), 1246–1258.

[34] T. D'Aprile, A. Pistoia. *Solutions with multiple alternate sign peaks along a boundary geodesic to a semilinear Dirichlet problem*, Commun. Contemp. Math. **16** (2014), 1–13.

[35] T. D'Aprile. *Sign-changing blow-up solutions for Hénon type elliptic equations with exponential nonlinearity*, Journal of Functional Analysis **268** (2015), 2067–2101.

[36] T. D'Aprile, A. Pistoia, D. Ruiz. *A continuum of solutions for the SU(3) Toda System exhibiting partial blow-up*, Proc. London Math. Soc. (3) **111** (2015), 797–830.

[37] T. D'Aprile. *Multi-bubble solutions for a slightly supercritical elliptic problem in a domain with a small hole*, J. Math. Pures Appl. (9) **105** (2016), 558–602.

[38] T. D'Aprile, A. Pistoia, D. Ruiz. *Asymmetric blow-up for the SU(3) Toda System*, J. Funct. Anal. **271** (2016), 495–531.

[39] T. D'Aprile, P. Esposito. *Equilibria of point vortices on closed surfaces*, Ann. Sc. Norm. Super. Pisa Cl. Sci. (5), in corso di stampa.

[40] T. D'Aprile, F. De Marchis, I. Ianni *Prescribed Gauss curvature problem on singular surfaces*, submitted for publication.

Monographs

[41] T. D'Aprile. *Semiclassical states for some classes of nonlinear Schrödinger equations,* tesi di perfezionamento, Scuola Normale Superiore di Pisa, 2002.

[42] P. Cannarsa, T. D'Aprile. *Introduzione alla teoria della misura e all'analisi funzionale,* UNITEXT, 35. Sotto-collana: La Matematica per il 3+2. **Springer-Verlag Italia**, Milano 2008.

[43] P. Cannarsa, T. D'Aprile. *Introduction to measure theory and functional analysis,* UNITEXT, 89. La Matematica per il 3+2. **Springer**, Cham 2015.

Selected Research Talks

- *Limite semiclassico per un'equazione ellittica non lineare: esistenza e concentrazione delle soluzioni*, University of Bari. May 25th 2000.
- *Semiclassical limit for a nonlinear elliptic field equation: one-bump and multi-bump solutions*, "Third World Congress of Nonlinear Analysts". Catania, July 19th–26th 2000.
- *Problemi di massimo e di minimo: introduzione al Calcolo delle Variazioni*, "XXII corso di orientamento universitario" organized by Scuola Normale Superiore di Pisa. Cortona, September 3th–9th 2000.
- *Concentration of solutions for the nonlinear Schrödinger equation*, "Third Turin Fortnight on Nonlinear analysis". Torino, September 24th–28th 2001.
- *Fenomeni di concentrazione per una classe di equazioni di Schrödinger non lineari*, "Giornate non lineari". Università di Roma "La Sapienza", January 9th–11th 2003.
- *Limite semiclassico per le equazioni di Maxwell-Schrödinger*, "XVII convegno dell'Unione Matematica Italiana". Milano, September 8th–13th 2003.
- *Semiclassical limit for some classes of nonlinear Schrödinger equations with the electromagnetic field*, workshop on "Variational methods and the nonlinear Schrödinger Equation". EPFL Lausanne, February 9th–13th 2004.
- *Semiclassical states for the system of Maxwell-Schrödinger equations.* EPFL Lausanne, May 19th 2004.
- *Spike layered solutions for a coupled elliptic system.* Department of Mathematics, "The Chinese University of Hong Kong", April 21st 2005.
- *On the location of interior and boundary peaks for some singularly perturbed Dirichlet problems*, "Fifth Turin fortnight on nonlinear analysis". Torino, September 13th–16th 2005.
- *On the effect of the domain geometry on interior and boundary spike solutions for a semilinear Dirichlet problem*, "School in nonlinear analysis and calculus of variations". Pisa, October 17th–22th 2005.
- *Soluzioni a uno e a più picchi per il sistema di Schrödinger-Poisson.* Dipartimento di Metodi e Modelli Matematici, Università di Roma "La Sapienza", April 12th 2006.
- *Existence and profile of sign-changing multi-peak solutions of a semiclassical nonlinear Schrödinger equation*, workshop on *Variational and topological methods in nonlinear phenomena.* Otranto, May 1st–5th 2008.
- *Sign-changing multi-peak solutions for some singularly perturbed elliptic problems.* Departamento de Análisis Matemático, Universidad de Granada, February 9th 2009.

- *On the number of sign-changing solutions with a k-spike pattern for a nonlinear Schrödinger equation*, "The First Bicocca Junior Workshop on Nonlinear PDEs and Variational Methods". Milano, June 18th–19th 2009.
- *Sign-changing solutions with multiple interior peaks for some semilinear Neumann and Dirichlet problems*, Dipartimento di Matematica, Università di Roma "La Sapienza", June 9th 2011.
- *Solutions with mixed positive and negative spikes for some singularly perturbed elliptic problems*, "Nonlinear PDE Days". Giessen, June 16th–17th 2011.
- *Sign-changing multi-peak solutions for some nonlinear Schrödinger equations*, "Workshop on Nonlinear Differential Equations". Pienza, November 7th–11st 2011.
- *Solutions with mixed positive and negative spikes for some semilinear elliptic problems*, "Workshop on Nonlinear Elliptic PDE's and Applications". Granada, December 15th–16th 2011.
- *Multiple blow-up solutions for singular Liouville-type equations*, workshop on "Singular limit problems in nonlinear PDEs". CIRM Luminy, November 26th–30th 2012.
- *Multi-bubble solutions for a slightly supercritical elliptic problem in a domain with a small hole*, "International Workshop on Variational Problems and PDEs", São Paulo – Brazil, September 2nd–6th 2013.
- *Soluzioni di tipo multi-bubble per un problema ellittico leggermente sopracritico in un dominio perforato*, Sapienza Università di Roma, November 28th, 2013.
- *Blowing-up solutions for the singular Liouville equation on closed surfaces*, Università di Roma "Tor Vergata", February 17th, 2015.
- *Blowing-up solutions for the the singular mean-field equation on compact surfaces*, "Nonlinear elliptic PDEs at the End of the World", Punta Arenas – Chile, March 2nd–6th 2015.
- *Multiple blowing-up solutions for the singular Liouville equation on closed surfaces*, "Equadiff 2015", Lyon, July 6th–10th 2015.
- *Existence results for the singular Liouville equation on closed surfaces*, "Achievements and Perspectives in Nonlinear Analysis", Bari, June 14th–17th 2016.
- *Existence results for the prescribed Gauss curvature problem on closed surfaces*, "Asymptotic Patterns in Variational Problems: PDE and Geometric Aspects", Oaxaca – Messico, September 26th–30th 2016.

Visiting Positions

- *Centro Bernoulli, École Polytechnique Fédérale de Lausanne*. Losanna, May 3th–28th 2004.
- *Department of Mathematics, The Chinese University of Hong Kong.* Hong Kong, April 10th–29th 2005 .
- *Departamento de Análisis Matemático, Universidad de Granada.* Granada, February 8th–15th 2009.

Other Activities

- Referee for the following journals: *Commun. Contemp. Math.*, *Commun. Partial Differential Equations*, *Commun. Pure Appl. Anal.*, *J. Differential Equations*, *J. Funct. Anal.*, *J. Math. Anal. Appl.*, *Math. Z.*, *Mediterranean J. Mathematics*, *Calc. Var. Partial Differential Equations*).
- Referee for *2010 FONDECYT National Research Funding Competition* (Chile).
- Co-organizer of "Nonlinear PDE days in Roma 1+2+3", Rome, April 2nd–3th 2012.

Research Projects

- Since 2004, member of *Gruppo Nazionale per l'Analisi Matematica, la Probabilità e loro Applicazioni (GNAMPA).*
- From 1999 to 2011, partecipation to the MIUR PRIN-project *Metodi variazionali e topologici ed equazioni differenziali non lineari,* coordinator Prof. V. Benci.
- Partecipation to the 2010 GNAMPA-research project *Energia ridotta in alcuni problemi semilineari non-compatti*, coordinator Dr. P. Esposito.
- Since 2012, partecipation to the MIUR PRIN-project *Aspetti variazionali e perturbativi nei problemi differenziali nonlineari,* coordinator Prof. S. Terracini.
- Coordinator of the 2014 GNAMPA-research project *Fenomeni di concentrazione per problemi singolarmente perturbati con nonlinearità esponenziali.*
- Partecipation to the 2016 GNAMPA-research project *Esistenza e molteplicità di soluzioni per alcuni problemi ellittici non lineari*, coordinator Dr. G. Vaira.

Research Interests

My scientific and research interests include the following subjects:

- positive and sign-changing multi-peak solutions for singularly perturbed elliptic problems;
- nonlinear field equations coupled with Maxwell equations;
- semiclassical limit for nonlinear Schrödinger equations;
- blowing up solutions for Liouville-type equations;
- blow-up phenomena for the $SU(3)$ Toda system;
- prescribed Gauss curvature problem on singular surfaces.

My research activity is mainly concerned with concentration phenomena arising in singularly perturbed semilinear elliptic problems that have been the subject of many studies in the last two decades. Notable examples broadly treated in the literature are: nonlinear Schrödinger equations in the semi-classical limit or systems of such equations, systems modelling biological pattern formation such as the Gierer-Meinhardt model,

the Keller-Segel model of chemotaxis, the Ginzburg-Landau model for superconductivity, Gelfand's problem in combustion theory. Often in the above settings one deals with a semilinear elliptic equation depending on a small parameter, defined in a region of Euclidean space or a finite dimensional Riemannian manifold, subject to an appropriate set of boundary conditions. Concentration phenomena have also been central in conformal geometry, where singular behavior arises in the form of bubbling triggered by the presence of critical behavior in the nonlinearities. Here the parameters come from scaling invariance and are somewhat "hidden".

When the parameter tends to the singular value, solutions concentrate on subsets of the domain, and it is of fundamental importance to localize these subsets. Often the subsets can be described as critical sets of a limit function, defined on a finite-dimensional space and involving an external potential or the Green's function of the domain. As an example, semilinear equations on two-dimensional domains with exponential type nonlinearity, e.g. the sinh-Poisson or the Liouville equation, lead to the N-vortex Hamiltonian from fluid dynamics as limit function. This is defined on the configuration space of N-points in the domain and its critical points are stationary point vortex distributions.

Nonlinear Schrödinger equations

A large part of my papers deals with the existence, multiplicity and asymptotic behaviour of solutions for some classes of nonlinear Schrödinger equations in the semiclassical limit. Equations of this type arise in different problems from Mathematical Physics, for instance, in nonlinear optics and in plasma physics. A large number of phenomena have been studied for such equations and many interesting relations have been pointed out between the features of the equation and the asymptotic profile of the solutions. More precisely, the object is to establish the existence of solutions highly concentrated near a certain number of points or, in more complicated situations, near a curve or a hypersurface. Such phenomena have a relevant physical interest since the semiclassical limit formally describes the transition from Classical Mechanics to Quantum Mechanics. This line of research has been extensively pursued in the last years by many authors; we recall, among many others, Ambrosetti, Badiale, Cingolani, Dancer, Del Pino, Felmer, Grossi, Li, Malchiodi, Musso, Ni, Pistoia, Takagi, Yan, Wei, Winter, ecc. My first scientific contributions in this direction are in collaboration with M. Badiale, V. Benci and J. Wei and mainly concern the construction of families of concentrated solutions for different models of nonlinear perturbations of the Schrödinger equation. In particular I wish to mention the concentration results on a sphere with M. Badiale and V. Benci, which are one of the first examples of higher-dimensional concentration set. Moreover in a set of papers with J. Wei we considered the Schrödinger equation in the presence of a charged particle interacting with its own electromagnetic field (Schrödinger-Poisson system), which in some aspects behaves in striking contrast with the single equation case: for instance, among other things, we have established that the least energy solutions of the Dirichlet problem exhibit a concentration behaviour at the boundary.

While there is a wide literature concerning positive concentrated solutions, the case of sign-changing solutions has been analyzed only recently. In a series of papers in collaboration with A. Pistoia and D. Ruiz we drew

our attention on the stationary Schrödinger equation with a subcritical odd nonlinearity in a domain without any symmetry assumption. By setting up a delicate min-max scheme, we provide solutions exhibiting peaks of alternating sign. The classical variational arguments turned out to be not sufficient to face the new situation where the interaction among the bumps depends on their respective sign, thus requiring non trivial adaptations and new original approaches.

Almost Critical Problems

Another research line in which I worked is the application of min-max principles to the existence and asymptotic behaviour of blowing-up solutions, possibly with opposite polarities, for problems involving the critical Sobolev exponent (slightly subcritical problems, slightly supercritical problems, Bahri-Coron problems, etc.). The situation is more delicate due to the loss of compactness which cause technical difficulties. A first result has been obtained in collaboration with T. Bartsch and A. Pistoia for a slightly subcritical problem in a convex domain with symmetries.

Singular Liouville Equations

More recently I focused on the existence of solutions with multiple concentration for a Liouville-type problem involving singular sources. This problem arises in different models both from physics and geometry, in particular in the study of Chern-Simons vortex theory and in the prescribed Gaussian curvature problem. In vortex theory the interest in constructing blowing-up solutions is related to relevant physical properties, in particular the presence of vortices with a strongly localised electromagnetic field. By perturbative methods combined with blow-up analysis, I obtained a multiplicity result, thus extending the paper of Del Pino-Kowalczyk-Musso to the case of multiple singular sources. In particular I proved that, under suitable restrictions on the weights of the sources, if several sources exist then the more involved topology generates a large number of blow-up solutions. Moreover, in collaboration with P. Esposito we considered the Liouville equation on compact surfaces and we constructed solutions exhibiting a blow-up behavior near a finitely many number of points. More importantly, we have deduced new existence results in a perturbative regime for the case of the sphere with respect to the ones already available in literature via degree theory (Chen-Lin) or variational approach (Bartolucci-Malchiodi, Malchiodi-Ruiz).

Toda System

Another recent line of research deals with some types of blow-up phenomena for the so-called Toda-system, which is a natural generalization to systems of the classical Liouville equation, by using a singular perturbation method; in particular in collaboration in A. Pistoia and D. Ruiz we proved the existence of a continuum of solutions for which both components blow-up at the same point. This blow-up behavior is asymmetric, in the sense that the two components are blowing up at a different speed; moreover one component includes also a certain global mass.

Prescribed Gauss Curvature problem on singular surgaces

I considered a classical problem in differential geometry, namely the question on the existence of a conformal metric on a punctured Riemann surface $\Sigma \setminus \{p_1, \dots, p_\ell\}$ with prescribed Gauss curvature K and admitting conical singularities of orders α_i's at the points p_i's. The problem is far from being completely settled, even in the regular case (i.e. when $\alpha_i = 0$ for all i). Many positive results concerning existence have been provided for the case of strictly positive prescribed curvature K, which is relevant from a physical point of view, while the case of K sign-changing has not previously been studied for a general singular surfaces. In collaboration with F. De Marchis and I. Ianni we established new existence results via a perturbative approach for the singular problem with K sign-changing when the total multiplicity $\sum_{i=1}^{\ell} \alpha_i$ approaches an integer value from the left side.

Teaching

- 1999–2001: tutorials for a diploma course at Scuola Normale Superiore, Pisa.
- 2001/2002: tutorials for the following courses at University of Bari:
  Istituzioni di Analisi Superiore (I modulo), corso di laurea in Matematica,
  Istituzioni di Analisi Superiore (II modulo), corso di laurea in Matematica.
- 2002/2003, tutorials for the following courses at University of Bari:
  Istituzioni di Analisi Superiore (I modulo) corso di laurea in Matematica,
  Istituzioni di Analisi Superiore (II modulo), corso di laurea in Matematica,
  Calcolo I, corso di laurea in Fisica Applicata.
- 2003/2004, tutorials for the following courses at University of Bari:
  Istituzioni di Analisi Superiore 1, corso di laurea triennale in Matematica,
  Istituzioni di Analisi Superiore 2, corso di laurea triennale in Matematica,
  Istituzioni di Matematiche I, corso di laurea triennale in Scienze dei Materiali.
- 2004/2005, tutorials for the following courses at University of Bari:
  Istituzioni di Analisi Superiore 1, corso di laurea triennale in Matematica,
  Istituzioni di Analisi Superiore 2, corso di laurea triennale in Matematica,
  Calcolo I, corso di Laurea triennale in Fisica.
- 2005/2006, tutorials for the following courses at University of Roma "Tor Vergata":
  CAM: Complementi di Analisi Matematica, corso di laurea specialistica in Matematica,
  Metodi Numerici per la Grafica 2, corso di laurea triennale in Scienze dei Media e della Comunicazione.
- 2006/2007, tutorials for the following courses at University of Roma "Tor Vergata":
  CAM: Complementi di Analisi Matematica, corso di laurea specialistica in Matematica,
  Metodi Numerici per la Grafica 2, corso di laurea triennale in Scienze dei Media e della Comunicazione,
  Analisi Armonica, corso di laurea triennale in Scienze dei Media e della Comunicazione.

- 2007/2008, tutorials for the following courses at University of Roma "Tor Vergata":
  CAM/1: Complementi di Analisi Matematica 1, corso di laurea specialistica in Matematica,
  Metodi Numerici per la Grafica 2, corso di laurea triennale in Scienze dei Media e della Comunicazione,
  Analisi Matematica 1, corso di laurea triennale in Matematica.

- 2008/2009, tutorials for the following courses at University of Roma "Tor Vergata":
  CAM/1: Complementi di Analisi Matematica 1, corso di laurea magistrale in Matematica,
  Metodi Numerici per la Grafica 2, corso di laurea triennale in Scienze dei Media e della Comunicazione,
  Analisi Matematica 1, corso di laurea triennale in Matematica.

- 2009/2010, tutorials for the following courses at University of Roma "Tor Vergata":
  CAM/1: Complementi di Analisi Matematica 1, corso di laurea magistrale in Matematica,
  Calcolo I, corso di laurea triennale in Scienza dei Materiali,
  Analisi Matematica 1, corso di laurea triennale in Matematica.

- 2010/2011, tutorials for the following courses at University of Roma "Tor Vergata":
  Analisi Matematica 4, corso di laurea triennale in Matematica,
  Calcolo II, corso di laurea triennale in Scienza dei Materiali.

- 2011/2012, tutorials for the following courses at University of Roma "Tor Vergata":
  Analisi di Fourier 1, corso di laurea triennale in Scienze e Tecnologie per i Media.
  Analisi Matematica 4, corso di laurea triennale in Matematica.

- 2012/2013, teacher of *Analisi di Fourier 1*, corso di laurea triennale in Scienze e Tecnologie per i Media, University of Roma "Tor Vergata".

- 2013/2014, teacher of *Analisi Matematica 3*, corso di laurea triennale in Scienze e Tecnologie per i Media, University of Roma "Tor Vergata".

- 2014/2015, teacher of *Analisi Matematica 3*, corso di laurea triennale in Scienze e Tecnologie per i Media, University of Roma "Tor Vergata".

- 2015/2016 (University of Roma 'Tor Vergata'):
  tutorials for the couse *Mathematical Analysis I*, corso di laurea triennale in Engineering Sciences.
  teacher of *Analisi di Fourier*, corso di laurea triennale in Scienze e Tecnologie per i Media.

Rome, September 19th 2016.

Dr. Teresa D'Aprile