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Differential Equations and Mathematical Physics**

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EDUCATION AND SCIENTIFIC DEGREES:

Diploma in Mathematics (with honor) of the M.Lomonosov Moscow State University 1976.

“Candidate of sciences” in Physical and Mathematical sciences (Differential Equations and Mathematical Physics) of Moscow State University 1979.

“Doctor of sciences” in Physical and Mathematical sciences (Differential Equations and Mathematical Physics) of Tbilisi State University 2004

PRIZES AND AWARDS:

- **1984 - I.Vekua Prize of the Georgian Academy of Sciences;**
- **2009 – Nikolai N. Bogoliubov’s memorial medal of Ukrainian Mathematical Congress**

TEACHING COURSES:

- **Generalized Functions (Distributions) and their applications**
- **Partial differential equations**
- **Some Elements of Mathematics in the Nature and in Arts**
- **Calculus**
- **Integral equations and Eigenvalues**

RESEARCH INTERESTS:

Partial differential equations (Qualitative theory of high order differential equations, asymptotic behavior of solutions, a priori estimate of Saint-Venant’s type and its applications, operational methods of solutions), Analytic representation of geometric figures and trajectories, Ribbon and Bulky Knots and Links.

VISITING PROFESSOR of:

• **„IWR“** - (Interdisziplinäres Zentrum für Wissenschaftliches Rechnen der Universität Heidelberg), Germany, Prof. W.Jäger– 1995;

• **Università degli Studi di Roma “La Sapienza”**, four times (Dipartimento Matematica Istituto “Guido Castelnuovo, grants C.N.R. and Atteneo), Rome, Italy, Prof. P.E.Ricci- 1998, 2001,2004,2005;

• **University of Cologne** - Germany - **2008**

• **Università degli Studi di Salerno**”(Dipartimento di Matematica) Salerno, Italy, Joint Scientific researches with Prof. M.Transirico– 2012

• **Vilnius University - Grant of the researchers council of Lithuania** 188716281- lectures, seminars in Lithuania Institutions – IAPS -250000-2618

THE MOST IMPORTANT FELLOWSHIPS AND GRANTS

- **Guest of M.Lomonosov Moscow State University** – (Joint Scientific researches with Prof. O. Oleinik) 1983-1984
- **Guest of “Royal Society”** - (London, “Sir J. Kelly Institute of applied mechanics”, of Westminster University, London, Joint Scientific researches with Prof. L. Xantis - 1993) - Fellowship of “Royal Society”
- **Chairman of projects - INT/32/1996 and INT/08/1997** - Fellowship of Developments OSGF (“Open Society Georgia Foundation”);
- **Performer** of Grants of Academy of Sciences of Georgia 1998, 1999, 2001-2003, 2004-2005;
- **Performer** of the project of Georgian National Sciences foundation N SP09-10 10.II.2009 and N 04/100 29.IV.2010 “**Original lectures for popularization of mathematical education for students and teachers of primary and high schools in the different regions of Georgia**”.
- **Coordinator** - of the **ISPM** (International Seminar in Physics and Mathematics) **UNESCO** Regional Bureau for Science in Europe, Tbilisi, **1999 – 2005**
- **Collaborator** (“Collaborazione Coordinata e Continuativa” – Universita Roma 1, “La Sapienza”) – cochairmen of the project with Prof. P.E.Ricci: “Metodi operatoriali, funzioni speciali multidimensionali e applicazioni alla soluzione di problemi al contro per equazioni alle derivate parziali” – 2007-2008
- **Performer** of Grants FR/358/5-109/14 – (Continuum Mechanics) 2016-up now

POSITIONS HELD AND ACADEMIC EXPERIENCE:

A. Razmadze Institute of Mathematics (researcher, Tbilisi, 1980-1988), I. Vekua Institute of Applied Mathematics (Deputy director, Head of Department of Mathematical Physics, Tbilisi, 1988-2005), Iv.Javakhishvili Tbilisi State University (Head of Scientific Network, Coordinator, Vice Dean of Faculty 1998-2005)

EDITORIAL ACTIVITIES

- Member of editorial council of the scientific journal “[Seminar of I. Vekua Institute of Applied Mathematics](#)”, 1988- 2008 ;
- Editor of journal “[Proceedings of I. Vekua Institute of Applied Mathematics](#)” 1988- 2008
- Member of Editorial Board and technical editor of scientific journal “[Reports of enlarged session of the seminar of I. Vekua Institute of Applied Mathematics](#)” 1988 – 2008
- Member of Editorial council of scientific and practical journal “Cardiology and Internal Medicine -XXI” (Achievements and Problems) 2016-up now;
- Editor – (with J. Gielis and P.E.Ricci) of **Book “Modeling in Mathematics”** Atlantis Press <https://link.springer.com/book/10.2991/978-94-6239-261-8> 2017;

SUPERVISION OF POST-GRADUATE STUDENTS:

of “World Federations Students” in 2001-2003, of Ph. D. students at Tbilisi State University; First award for supervisors in Moscow State University for the students scientific works in 1983, second award of SOFT – 99 (Tbilisi) and 3 award for supervisors of OSGF for the students sci. works 2003

MAIN SCIENTIFIC ARTICLES (from 84):

1. **I. Tavkhelidze**, Liouville's theorems for second order elliptic and parabolic equations. (Russian) *Vestnik MSU* (Moscow state university). 1976. N 4. pp.28-35 ;
2. O. Oleinik, **I. Tavkhelidze**, and G. Yosif'an, Bounds for the solutions of a biharmonic equation in the neighborhood of non-regular boundary points and at infinity. *Russian Math. Surveys* 33:3(201) (1978), pp.169-170;
3. **I. Tavkhelidze**, On the solutions of polyharmonic equations with Dirichlet boundary conditions, *Soviet math. dokladi* 1979 v.20, N4(208), trans. Keller , pp.709-713;

4. O. Oleinik, **I. Tavkhelidze**, and G. Yosif'an, Asymptotic behavior of solutions of biharmonic equations in the neighborhood of irregular points of boundary and at infinity. *Proceeding of Moscow Mathematical Society* 1981 v.42, pp.160-175;
5. O. Oleinik, **I. Tavkhelidze**, and G. Yosif'an, On the behavior of solutions of the equations of plane elasticity the neighborhood of irregular points and at infinity. *Amer. Math. Soc. Transl.* 1985, (2), v. 126, (trans. R. Schmidt), pp. 45-60;
6. **I. Tavkhelidze**, Analogue of St-Venant's principle for a polyharmonic equation and application of it, *Math. USSR Sbornik* 1983, v.46 N 2. (trans. H.H. McFaden), pp.237-253;
7. **I. Tavkhelidze**, Natural boundary conditions for polyharmonic equations on the plane. (Russian), *Partial Differential equations and its applications*. Tbilisi, 1982, 227-234;
8. **I. Tavkhelidze**, The Green's functions from polyharmonic equations in the half-space, *Uspehi. Mat. Nauk* 1989, v. 44, 4 (268), p.215;
9. C. Cassisa, P.E. Ricci and **I. Tavkhelidze**, On the behavior of solutions of the one special type 4-th order elliptic equation in the neighborhood of irregular boundary points. *Applied Mathematics and Informatics* V.4. N2, 1999, Tbilisi, pp.11-29;
10. **I. Tavkhelidze**, Some property of one class of geometrical figures. *Bulletin of TICMI* v.4, 2000, pp. 51-55;
11. C. Cassisa, P.E. Ricci and **I. Tavkhelidze**, An Operatorial Approach to Solutions of Boundary Value Problems in the Half-Plane. *Journal of Concrete and Applied Mathematics (USA)* V.1 (2003), pp.37-62;
12. C. Cassisa, P.E. Ricci and **I. Tavkhelidze**, Operational Identities for circular and Hyperbolic Functions and their Generalizations. *Georgian Mathematical Journal* v. 10 (2003), N 1, pp.45-56;
13. C. Cassisa, P.E. Ricci and **I. Tavkhelidze**, Exponential operators for solving evolution problems with degeneration, *Journal of Applied Functional Analysis (USA)* N 1, (2006), pp. 33-50;
14. C. Cassisa, P.E. Ricci and **I. Tavkhelidze**, Exponential operators and solution of pseudo-classical evolution problems, *Journal of Concrete and Applicable Mathematics (USA)* N4, (2006), pp. 33-45;
15. **I. Tavkhelidze** and P.E. Ricci, Classification of a Wide Set of Geometric Figures, Surfaces and Lines - (Trajectories), *Rendiconti Accademia Nazionale delle Scienze detta dei XL, Memorie di Matematica e Applicazioni, Serie V, vol. XXX, Parte 1, 2006 - 124 °, Dalla Fondazione (1782) Roma*, pp. 191-212;
16. **I. Tavkhelidze**, On Some Properties of Solutions of Polyharmonic Equation in Polyhedral Angles, *Georgian Mathematical Journal* v. 14 (2007), N 3, pp. 565 – 580;
17. P.E. Ricci and **I. Tavkhelidze**, An introduction to operational techniques and special polynomials, *Journal of Mathematical Sciences* vol. 157, N1, 2009, pp. 161-189;
18. C. Cassisa, P.E. Ricci and **I. Tavkhelidze**, Operational methods and solution of BVP with periodic data, *Journal of Mathematical Sciences* vol. 157, N1, 2009, pp. 85 – 97;
19. C. Cassisa, P.E. Ricci and **I. Tavkhelidze**, About Connection of the generalized Möbius Listing's surfaces GML_2^n with Sets of Knots and Links, *Lecture Notes of Seminario Interdisciplinare di Matematica* Vol. IX. (2010) pp. 187- 200;
20. P.E. Ricci and **I. Tavkhelidze**, About Some Geometric Characteristic of the Generalized Möbius Listing's surfaces, *Georgian Mathematical Journal*, v. 18 (2011), N 2 De Gruyter, pp. 329-343;
21. **I. Tavkhelidze**, Classification of a Wide Set of Trajectories, *Proceedings of the International scientific conference devoted to 80th anniversary of Academician I.V. Prangishvili "Information and Computer technologies, Modelling, Control"* – USA – Nova Publisher 2011, pp. 571-581;

22. **I. Tavkhelidze**, About Connection of the Generalized Möbius-Listing's surfaces with Sets of Ribbon Knots and Links, *I -* , 2009, 2. 2011, pp. 177-190;
23. Johan Gielis, Diego Caratelli, Yohan Fougerolle, Paolo Emilio Ricci, **Ilia Tavkhelidze** and Tom Gerats, Universal Natural Shapes: From Unifying Shape Description to Simple Methods for Shape Analysis and Boundary Value Problems, *journal PlosONE* , 27,IX, 2012, pp.1-18
<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0029324>;
24. J.Gielis, P.E.Ricci and **I. Tavkhelidze**, Veliki uzlovi I poveznici dobivene rezanjem generaliziranih Möbius-Listing tijela (Croatian per. Tanja Soucie), *Pou ak - asopis za metodiku i nastavu matematike Godina 13., Broj 51., Listopad 2012*, pp. 10-18;
25. **I. Tavkhelidze**, C.Cassisa, J.Gielis and P.E.Ricci, About “Bulky” Links, Generated by Generalized Möbius-Listing's bodies GML^n_3 , *Rendiconti Lincei Mat. Appl.* 24 (2013), pp. 11-38;
26. D.Caratelli, J.Gielis, P.E.Ricci and **I. Tavkhelidze**, The Dirichlet Problem for the Laplace Equation in Suoershaped Annuli, *Boundary value Problems a Springer open Journal* , **2013**:113 Ded. to Prof Hari M. Srivastava <http://www.boundaryvalueproblems.com/content/2013/1/113/abstract>;
27. S.Monsurro', **I. Tavkhelidze** and M. Transirico Uniqueness results for the Dirichlet Problem for higher order elliptic equations in polyhedral angles - *Boundary Value Problems* 2014:232 <http://www.boundaryvalueproblems.com/content/2014/1/232>
28. Johan Gielis. Rik Verhulst, , Diego Caratelli, Paolo E. Ricci and **Ilia Tavkhelidze**- On means, polynomials and special functions THE TEACHING OF MATHEMATICS (Publisher Društvo matematicara Srbije, Beograd ISSN: 1451-4966) 2014, Vol. XVII, 1, pp. 1–20
<http://elib.mi.sanu.ac.rs/files/journals/tm/32/tm1711.pdf>
29. D. Caratelli, J. Gielis, P. E. Ricci, and I. Tavkhelidze Some Properties of “Bulky” Links Generated by Generalized Möbius- Listing’s Bodies GML^n_2 *Journal of Mathematical Sciences, Vol. 216, No. 04, July, 2016*
30. **Tavkhelidze I.** ABOUT STRUCTURE AND SOME GEOMETRIC CHARACTERISTIC OF THE BULK LINKS WHICH APPEAR AFTER CUTTING OF GENERALIZED MOBIUS-LISTINGS BODIES Proceedings of I. Vekua Institute of Applied Mathematics Vol. 65, 2015
31. Ilia Tavkhelidze, Diego Caratelli, Johan Gielis, Paolo Emilio Ricci, Mamanti Rogava, Maria Transirico [On a Geometric Model of Bodies with “Complex” Configuration and Some Movements](#) Modeling in Mathematics Proceedings of the Second Tbilisi-Salerno Workshop on Modeling in Mathematics, Atlantis Transaction in Geometry v.2 pp.129-158
32. Ilia Tavkhelidze, Paolo Emilio Ricci [Some Properties of “Bulky” Links, Generated by Generalised Möbius–Listing’s Bodies \$GML^n_m\{0\}\$](#) Modeling in Mathematics Proceedings of the Second Tbilisi-Salerno Workshop on Modeling in Mathematics , Atlantis Transaction in Geometry v.2 pp.159-185

MAIN CONFERENCES, SEMINARS AND OTHER SCIENTIFIC FORUMES(42)

- Moscow State University - **I.G. Petrovski Conference on Differential Equation**(Every Year)**1976 – 1988** and in **1991**;
- Tbilisi - Georgia –**Enlarged Sessions of the seminar of I. Vekua Institute of Applied Mathematics**(Every Year) - 1988 - up to now. (1988 – 2008 Member of Organizing Group);
- “Noorus” – Estonia-**International School – Workshop “Small parameters method and Application of it ”**– 1977 ;
- Lviv- Mukachovo – Ujgorod (Ukraina)– **International Conference “Partial Differential Equations”**– 1981;

- Erevan – Tsakhkadzor - Armenia –**VIIURSS- Czechoslovak Seminar “Application of the methods of Functions Theory and Functional Analysis to the problems of Mathematical Physics”**1981 ;
- Novosibirsk – Russia – **International Conference “M.A.Lavrentiev’s seminar in Mathematic, Mechanic and Physic”**1982;
- Tabakhmela, Georgia - **NATO Advanced Research Workshop - “Air, Water and Soil Quality Modelling for Risk and Impact Assessment”** 2005 (One of the organizers)
- Tbilisi - Georgia–**“ISAAC” Conference on Complex Analysis, Partial Differential Equations, and Mechanics of Continua** 2007;
- Sabaudia - Italia – **4-th workshop Advanced Special Functions and Solutions of PDEs; Mean speaker** 2009<http://ricerca.mat.uniroma3.it/adspde/>
- Kiev-Ukraina -**Ukrainian Mathematical Congress – 2009** 27-29-VIII,http://www.imath.kiev.ua/~congress2009/program/Program_Topology.pdf
- Brussel – Belgium - **Math Art Summit** 2012 –
http://etopia.sintlucas.be/3.14/Wiskunst/Wiskunst_Brussels_2012_Friday.htm
- Salerno–Italy –**First Salerno - Tbilisi Worckshop “Modelling in Matematics”** (One of the organizers) 2014
- Tbilisi - Georgia - **Second Tbilisi –Salerno Worckshop “Modelling in Matematics”** (One of the organizers) 2015
- Amadora – Portugal -**International Conference on Differential & Difference Equations and Applications 2017, Main speaker** <https://sites.google.com/site/sandrapinelas/icddea-2017/d-main-speakers>