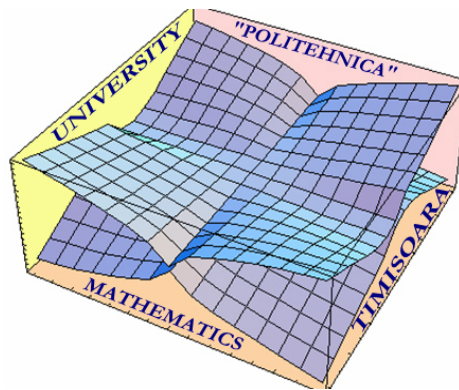


# DEPARTMENT OF MATHEMATICS



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## DEPARTMENT OF MATHEMATICS

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 Assoc. Prof. Dr. Doru PĂUNESCU, Scientific Secretary, [dpaunesc@etv.utt.ro](mailto:dpaunesc@etv.utt.ro)

### Researches in MATHEMATICAL ANALYSIS

#### RESEARCH FIELDS

- *Multifunction spaces. Convergences and continuities.* Topological convergence. Conservative multifunction nets. Quasi-monotonically increasing multifunction nets. Continuity of multifunction
- *Qualitative study of functional equations. Functional equations in distributions.* Iteration theory. Iterative and composite equations. Topological linear spaces of test functions. Distributions. Difference operators
- *Hyers-Ulam stability. Wavelet Analysis.* Frames. Wavelets. Hyers-Ulam stability of quadratic mappings. Frames in Hilbert spaces
- *Qualitative Theory of Functional Equations.* Existence and uniqueness of the solution. Monotony, derivability, stability of solution
- *Operator Theory. Operator ideals and interpolation.* Operator ideal. Real interpolation methods. Interpolation spaces. Szego-measures, Hardy-spaces

#### BOOKS

1. Sándor, J., Crstici, B., *HANDBOOK OF NUMBER THEORY* (II), Kluwer Academic Publishers (2004), 637 pages, ISBN 1-4020-2546-7 (HB), ISBN 1-4020-2547-5 (e-book)
2. Neamțu, N., *QUALITATIVE THEORY OF FUNCTIONAL EQUATIONS AND ELEMENTARY FUNCTIONS*, Ed. Politehnica, Timișoara (2004), 196 pages, ISBN 973-625-155-1

#### PUBLISHED PAPERS

1. Lipovan, O., *A probabilistic generalization of integrability for positive functions*, Journal of Mathematics, Novi-Sad, Nr.1, Vol.34, 2004;
2. Lipovan, O., *A criterion for pseudosubmeasurable functions*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom 49(63),1, 2004, 45-51;

3. Găvruta, P., *On the Hyers-Ulam-Rassias stability*, Nonlinear Functional Analysis and Applications, Vol. 9, No. 3 (2004), pp. 415-428;
4. Lipovan, O., *On the convergence for sequence of probabilistic metric structures-valued functions*, Annals of the „Aurel Vlaicu” University, Arad, Fasc. Mathematics - Informatics, 2004, pp.126-132;
5. Crstici, B., Dăianu, D., *New generalizations of Cauchy’s functional equation*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 1, 2004, pp. 7-12;
6. Neagu, M., *Studii asupra distribuțiilor iterate*, “Sem. de op. lin. și analitică” (S.L.O.H.A.) Timișoara 2004, pp.21-31;
7. Neagu, M., *Distributional Functional Identities characterizing polynomials*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom 49(63), 1, 2004, pp. 52-58;
8. Neagu, M., *Distributional functional identities characterizing  $\lambda$ -polynomials*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 2, 2004, pp. 38-43;
9. Tudor, Gh., *L’équation Diophantienne  $(x_1^{x_1})^{m_1} \cdot (x_2^{x_2})^{m_2} \cdot \dots \cdot (x_k^{x_k})^{m_k} = y_k^{y_k}$  (II)*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 1, 2004, pp. 13-19;
10. Tudor, Gh., *L’équation Diophantienne  $x_1^{x_1} \cdot x_2^{x_2} \cdot \dots \cdot x_k^{x_k} = y_1^{y_1} \cdot y_2^{y_2} \cdot \dots \cdot y_m^{y_m}$  (III)*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 2, 2004, pp. 1-8;
11. Tudor, Gh., Bînzar, T., *On a Diophantine equation*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie

Mathematics-Physics, Tom. 49(63), Fasc. 2, 2004, pp. 48-51;

12. Ciurdariu L., *On the topology of Loynes spaces*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 2, 2004, pp. 52-59;

### PERSPECTIVES

- Generalizations of classical functional equations and applications
- Studies on the stability of quadratic mappings
- The study of transfer of the continuity and quasi-continuity from the terms of a multifunction net to its pointwise limit in the general case of multifunction valued in a topological space
- Further developments in *Qualitative Theory of Functional Equations and Elementary Functions*

Contact: Assist. Liviu CĂDARIU, [lcadariu@etv.utt.ro](mailto:lcadariu@etv.utt.ro)

- Study of Operator Systems with Positive Definite Functions

### RESEARCH TEAM

- Prof. Dr. Borislav CRISTICI
- Prof. Dr. Titu BÂNZARU
- Prof. Dr. Gheorghe BABESCU
- Prof. Dr. Pașc GĂVRUȚĂ
- Assoc. Prof. Dr. Nicolae NEAMȚU
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- Assoc. Prof. Dr. Dobrinca MIHAILOV
- Assoc. Prof. Dr. Doru PĂUNESCU
- Lecturer Dr. Nicolae CRIVĂȚ
- Lecturer Dr. Nicolae COFAN
- Lecturer Dr. Tudor BÎNZAR
- Assist. Liviu CĂDARIU
- Assist. Adina JURATONI
- Assist. Loredana CIURDARIU
- Assist. Lucian Flavius PATER
- Assist. Maria Anastasia JIVULESCU

## Researches in ALGEBRA AND GEOMETRY

### RESEARCH FIELDS

- Differential Geometry and Applications
- Pseudo-riemannian manifolds. Ultrametrics, topological structures. Deformations, spaces of constant curvature. Non-twist systems, shearless tori, reconnection bifurcation, transport barrier. Dynamics of symplectic non-twist diffeomorphisms. Non-twist property is related to the violation of the main assumption of the KAM (Kolmogorov, Arnold, and Moser) theorem
- Theory of Categories. Ordered categories  $a$ -categories. Projective limits
- Analysis on Manifolds. Currents and distribution tensors on manifolds. Foliated Manifolds
- Distribution tensor. Dynamical systems
- Topological and differential geometric structures and their digitalization. Quaternionic structures. Generalized topology. Adjacency relation.  $\rho$ -set.  $\rho$ -topology. Surfel. Digital hypersurface. Digital object. First (second) class  $A$ -manifold.  $A$ -mapping.  $A$ -linear connection. Digitalization of a differential manifold. Quaternionic differential.  $H$ -derivability. Partial quaternionic derivatives

- Control problems on Matrix Lie Groups. Control integrability and stability on some concrete mechanical problems
- Lie groups. Hamiltonian mechanical systems. Poisson dynamics. Lie-Trotter formula
- Formal logic. Propositional logic. Formal set theory. The formal geometry.

### RESEARCH CONTRACTS

1. Theoretical and numerical study on *Frequency map analysis to detect boundary tori in the dynamics of non-twist maps* (supported for E. Petrișor by EURATOM-CEA France).
2. Investigation of non-twist behaviour of non-linear oscillators modeling phenomena in astrophysics (collaboration with a group from Universitat Politècnica de Catalunya, Barcelona)

### PUBLISHED PAPERS

1. Boja, N., *Basic general concepts in the network analysis*, Proceedings of the First International Conference on Computational Mechanics, Belgrade, nov. 2004, pp.1-23.
2. Lugojan, S., *Linear connection on discrete*

- manifolds*, Recent Advances in Geometry and Topology; Cluj University Press, 2004, ISBN 973-610-277-7, p.221-225;
3. Bota, C., *On a property of minimal sets of a homeomorphism*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 1, 2004, pp. 59-61;
  4. Bota, C., *A property of a monotone global semi-flow on a vector bundle*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 2, 2004, pp. 26-29;
  5. Bota, C., Popescu, D., *About the periodic trajectories of a dynamical system on a topological manifold*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 2, 2004, pp. 44-47;
  6. Milici, C., *Sur le calcul automatique des intégrales trigonométriques (III)*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 2, 2004, pp. 9-13;
  7. Vasii, C., *An ILB- manifold Structure on the Set of Riemannian Metrics on a Noncompact Manifold*, preprint DG\0402280, 2004, pp.1-21;

#### **PERSPECTIVES**

- Studies on the topology of invariant systems sets of continuous systems
- Studies on topological structures and deformations

#### **RESEARCH TEAM**

- Prof. Dr. Nicolae BOJA
- Prof. Dr. Emilia PETRIȘOR
- Assoc. Prof. Dr. Iosefina MIHUȚ
- Assoc. Prof. Dr. Dan DĂIANU
- Lecturer Dr. Constantin BOTA
- Lecturer Dr. Sorin LUGOJAN
- Lecturer Dr. Cristian LĂZUREANU
- Lecturer Dr. Camelia ARIEȘANU
- Assist. Dr. Cătălin Vasii
- Assist. Constantin MILICI

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### **Researches in APPLIED MATHEMATICS**

#### **RESEARCH FIELDS**

- Stochastic McShane Modeling with Applications in Economical Problems and Dynamical Systems. McShane’s stochastic belated integral. Stochastic McShane system
- Non Gaussian white noise. Probabilistic Structure and Applications. Sub-measures with probabilistic structures. Sub measurability and inerrability model
- The Study of the Applicability of Modern Numerical Methods (MEF, BEM, CVBEM) for the Solvability of Partial Differential Equations
- Aerodynamics of Specialized Nets. Hydrofoil theory. Boundary value problems
- Integral representations of complex functions. Integral equations. Numerical methods. Algorithms for approximation.
- Probabilistic metric structures random equations, fixed point theorems, time series, applications. Stochastic processes
- Probabilistic metric or 2-metric spaces. Random normed spaces. Random operators. Random functions. Fixed points
- Numerical analysis, mathematical software. Engineering and Computer Algebra Systems: Mathematica and MathWorks
- Park’s  $d-q$  orthogonal model. Optimal Power Price
- Differential equations and applications
- The mechanics and thermic properties of porous plaques. Porous plaques. Porous milieu
- Infinite dimensional Hamiltonian systems. Symplectic algebra and geometry. Poisson structure and Poisson brackets

#### **PUBLISHED PAPERS**

1. Constantin, I., Negrea, R., *On some Constructive Methods of the Solutions for Stochastic McShane Systems*, Preprint STPA nr. 156/ 2004, pp.1-21;
2. Constantin, Gh., Negrea, R., *An Application of Schauder’s Fixed Point Theorem in Stochastic McShane Modeling*, Journal of Fixed Point Theory, vol.5, no.4 , 37-52, 2004;

3. Petrișor, E., *Destruction of invariant circles of nontwist maps*, Preprint 04-427, (2004) pp 1-26, University of Texas;
4. Kovács, A., *Approximációs hodográf módszerek variánsainak alkalmazásai a gyakorlatban*, International Conference, Oradea, 27-29 mai, 2004, Scientific bulletin of Partium University, Oradea, Anul III, Nr.2, Decembrie 2004;
5. Goleț, I., *Probabilistic D-metric spaces*, Radovi Matematicki, 2004, pp.32-39;
6. Goleț I., *On probabilistic 2-normed spaces*, Journal of Mathematics of Novi Sad, 2004, pp.237-245;
7. Goleț, I., *On probabilistic metric structures*, Automatic Computers Applied Mathematics (ISSN1221-437X), Vol. 13(2004) No.3, pp. 13-19;
8. Nemeș, M., Păunescu, D., Vuc, Gh., *Expansion planning of power systems. Opportunity and risk*, WEC Regional Energy Forum, Neptun, Romania, June13-18, 2004, p. 81-88;
9. Nemeș, M., Păunescu, D., Vuc, Gh., *Minimize of hourly cost by gradual penalty tax*, IWESC - 5th International World Energy System Conference, Oradea 2004, pp.565-570;
10. Goleț, I., *Fixed point theorems in probabilistic d-metric spaces*, Bull. for Applied and Computer Mathematics Vol. CVI (2004), Budapest Univ. of Tech. and Economics, pp. 95-104;
11. Negrea, R., *On a class of Stochastic Integral Operator of McShane type*, Journal of Operator Theory , vol 153, 197-209, 2004;
12. Gîrban, A., *Some remarks on the Lyapunov-Malkin Theorem (I)*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 1, 2004, pp.62-73;
13. Gîrban, A., *Some remarks on the Lyapunov-Malkin Theorem (II)*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 2, 2004, pp. 14-25;
14. Dragomirescu, I., *Critical Rayleigh number in a convection in thawing subsea permafrost problem*, Scientific Bulletin of the „Politehnica” University of Timișoara, Serie Mathematics-Physics, Tom. 49(63), Fasc. 2, 2004, pp.30-37;

#### PERSPECTIVES

- Developments of stochastic McShane modeling with implications in economical problems and dynamical systems
- Study the Alfleš's equations of motion equilibrium, states and stability
- Extension of the Mathematica module *Optimal Power Price*, developed in collaboration with the Power Group at the Faculty of Electrotechnics and Electroenergetics
- Studies on stability and synchronism of electrical machines with Mathematica
- Studies on topological structures and deformations

#### RESEARCH TEAM

- Prof. Dr. Ioana CONSTANTIN
- Prof. Dr. Octavian LIPOVAN
- Prof. Dr. Adalbert KOVÁCS
- Assoc. Prof. Dr. Ioan GOLEȚ
- Assoc. Prof. Dr. Pavel NĂSLĂU
- Assoc. Prof. Dr. Doru PĂUNESCU
- Lecturer Dr. Romeo NEGREA
- Assist. Rodica ANGHELESCU
- Assist. Dan POPESCU
- Assist. Olivia BUNDĂU
- Assist. Bogdan CĂRUNTU
- Assist. Gheorghe TIGAN
- Assist. Florica RĂDUNĂ
- Assist. Remus ENE
- Assist. Ioan Ciprian HEDREA

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