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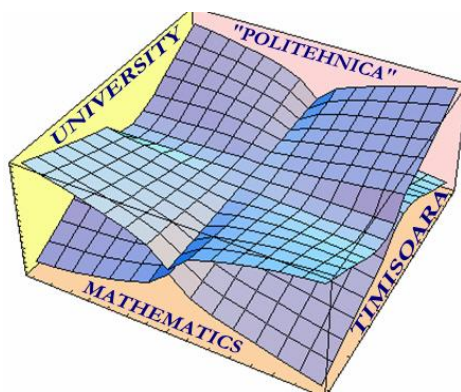
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Researches in *MATHEMATICS and APPLIED MATHEMATICS*

RESEARCH FIELDS

- *Functional equations. Functional equations inequalities.*

- *Frame and Wavelet Analysis. Hyers-Ulam stability.*

- *Analysis on manifolds pseudo-Riemannian.*

- *Stochastic analysis, stochastic differential equations, stochastic modeling.*

- *Qualitative Theory of Functional Equation.*

- *Operator Theory.*

- *Dynamical systems and applications.*

- *Fluid mechanics.*

- *Calculus of varions and optimal control. Program Analysis and Verification.*

- *Ordinary differential equations.*

- *Theory of a-categories.*

- *Functional analysis.*

- *Numerical methods, asymptotic methods.*

- *Numerical results with FreeFem++ (modelling and numerical simulations).*

- *Differential equations, numerical solutions, stability.*

- *Optimal control, collocation-type methods.*

- *Spectral methods in Hydrodynamic stability.*

- *Ricci flow. Spaces of Riemannian Metrics.*

- *GEOMETRY-Mechanical geometry*

RESEARCH GRANTS

1. S.C. ETA Automatizări Industriale Timişoara, No. 145/13.10.2008 (2009-2nd year) -*Stochastic models for analysis and prediction in automotive industry (*Modele stochastice de analiză şi predicţie aplicate in automatizarea industrială) (I. Golet).

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1. V. Marinca, N. Herisanu, C. Bota, B. Marinca, *An optimal homotopy asymptotic method applied to the steady flow of a fourth-grade fluid past a porous plate*, Applied Mathematics Letters, Vol. 22, No. 2, 2009, pp. 245-251, ISSN 0893-9659, (impact factor 0.948).

2. R. M. Tudoran, A. Aron, S. Nicoara, *On a Hamiltonian Version of the Rikitake System* SIAM Journal on Appl. Dynamical. Systems, Vol. 8, No. 1, 2009, pp. 454-479, ISSN 1536-0040 (impact factor 1.903).

3. C. I. Gheorghiu, F. I. Dragomirescu, *Spectral methods in linear stability. Applications to thermal convection with variable gravity field,* Applied Numerical Mathematics, Vol. 59, No. 6, 2009, pp. 1290-1302, ISSN 0168-9274, (impact factor 0.952).

4. A. Eckstein, *Unitary reduction for the two-dimensional Schrödinger operator with strong magnetic field*, Mathematische Nachrichten, Vol. 282, No. 4, 2009, pp. 504-525, ISSN 0025-584X, (impact factor 0.465).

5. M. A. Jivulescu, E. Ferraro, A. Napoli, A. Messina, *Exact dynamics of XX central spin model*, Physica Scripta, Vol. T135, No. 014049, 2009, pp. 1-4, ISSN 0031-8949, (impact factor 0.97).

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13. M. A. Jivulescu, R. Migliore A. Messina, *Electromagnetic control of dynamical localization conditions in 1D lattices with long-range intersite interactions,* International Journal of Quantum Information, Vol. 7, 2009, pp. 149-154, ISSN 0219-7499, (impact factor 0.774).

14. M. A. Jivulescu, E. Ferraro, A.Napoli, A. Messina, *Dynamical behaviour of an XX central spin model through Bethe Ansatz techniques*, Reports on mathematical Physics Vol. 64, 2009, pp. 315-327, ISSN 0034-4877, (impact factor 0.576).

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18. O. Pop, D. Paunescu, S. Kilyeni, M. Nemes, A. Kilyeni, C. Barbulescu, *Probabilistic Distribution Factors Assesment using OptimalPowerPlace Mathematica Software. Case study: Test 25 Buses Test Power System,* Proceedings of the 5th International Symposium on Applied Computational Intelligence and Informatics, May 28–29, 2009, Timisoara, Romania, pp. 453-458, ISBN 978-1-4244-4478-6, (ISI Proceedings).

19. L. Kovacs, A. Gyorgy, B. Benyo, Z. Benyo, A. Kovacs, *Soft computing control of Type 1 diabetes described at molecular levels*, Proc. of the SACI 2009, 5-th International Symposium on Applied Computational Intelligence and Informatics, Timisoara, Romania, May 28-29, 2009, pp. 99-104, ISBN 978-1-4244-4478-6, (ISI Proceedings).

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43. O. Lipovan, *Probabilistically and randomly submeasurable fuzzy metric spaces-valued functions*, Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Romania, Seria

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44. B. Caruntu, R. Negrea, I. Zaharie, I. Luminosu, *Numerical solution for the 2-dimensional quantum hydrodynamic model equations,* Buletinul Stiintific al Universitatii "Politehnica" din Timisoara, Romania, Seria Matematica-Fizica, Vol. 54(68), No. 1, 2009, pp. 77-83, ISSN 1223-6069.

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64. O. Bundau, M. Neamtu, *An economical growth model with tax evasion and delay-numerical simulation*, Proceedings of the IV-th International Conference "Economy and Transformation Management", Timişoara, 2009, pp. 173-179, ISSN 1842-4880.

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2. L. Gavruta, P. Gavruta, Chapter 7 - *Psi-additive mappings and Hyers-Ulam stability*, in book *Nonlinear Analysis and Variational Problems*, M. Pardalos et al. (eds.), in Honor of

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18. Gh. Babescu, A. Juratoni, O. Bundau, *Exercitii si probleme de analiza matematica,* Ed. Mirton, 2009, ISBN 978-973-52-0554-6, 433 pp.

19. O. Lipovan, *Matematici speciale. Ecuatii diferentiale si Teoria campurilor*, Editura Politehnica din Timisoara, ISBN 973-625-429-1 (2nd edition).

PERSPECTIVES

➢ Study the Stochastic Differential Equations with Markovian Switching and their applications to automotive engineering.

➢ Stability in so4 and so3. Numerical stability in mechanics geometry.

➢ New results on frames, fusion frames and Hyers-Ulam stability.

➢ Probabilistic applications to control statistic of quality and forecasting.

➢ Study the Stochastic Delay Differential Equations with Markovian Switching and their applications to financial modelling.

➢ Global dynamical systems on topological manifolds.

➢ Numerical Methods and Engineering Applications with Maple.

➢ Numerical Methods in Mathematics Financiar with Matlab.

➢ Calitativ studies of some dynamic systems using semigroup of operators.

➢ We intend to use the fixed points methods to obtain new results of stability for various types of functional equations

➢ Bifurcation theory.

➢ Deformation Geometry of material structure.

➢ Study the forward-backward stochastic differential equations and their applications to finance modelling

➢ Stochastic resonance phenomena and control of some electronics circuit s

➢ Participate at the conference and publish books.

RESEARCH TEAM

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➢ Prof.dr. Octavian LIPOVAN
➢ Prof.dr. Adalbert KOVÁCS
➢ Prof.dr. Gheorghe BABESCU
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