RESEARCH CENTER FOR APPLIED MATHEMATICS IN ENGINEERING SCIENCES

Contact details

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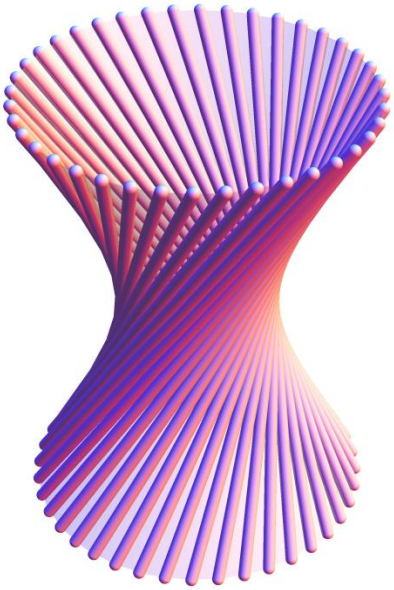

Areas of expertise

Numerical Analysis
-New methods and tools in Approximation Theory; Application of *MATHEMATICA*'s aproximation subroutines; High degree quadrature formulas; New algorithms for energy-minimizing curves and surfaces
Functional, Differential and Integral Equations and Calculus of Variations
-Existence and representation of single-valued and multivalued solutions. Hyers-Ulam stability of equations in algebraic and topological structures; Applications to the stability and perturbations of Dynamical Systems.
-Generalized equations of Euler-Lagrange and Euler-Gauss type used in the theory of 2D and 3D deformable models
Geometry
-Geometry of image formation in stereo vision, different camera models, calibration, system of multiple lenses and mirrors of specific type; Manifold learning and pattern recognition
Operator theory and Special functions
-Multivalued operator theory which is about the investigation of the fixed point properties of special multivalued operators; Investigating the properties of special functions, Riemann zeta, Hurwitz zeta and Polylogarithm functions
Modelling
-Ultrasound echocardiography; Computer-aided surgery (Prosthetic medicine); Dynamic image based modelling
Nonlinear and Convex Analysis and Mathematical Programming/Optimization
-Equilibrium problems; Optimization; Variational inequalities; Numerical Optimization; Numerical Optimization

Team

Prof. Dr. Math. Mircea Ivan; Prof. Dr. Math. Ioan Gavrea; Prof. Dr. Math. Ioan Raşa; Prof. Dr. Math. Alexandru Ioan Mitrea; Prof. Dr. Math. Dorian Popa; Prof. Dr. Math. Daniela Rosca; Prof. Dr. Math. Ioan Radu Peter; Assoc. Prof. Dr. Math. Daniela Inoan; Prof. Dr. Math Alina Sîntămărian; Assoc. Prof. Dr. Math. Dalia Cimpean; Assoc. Prof. Dr. Math. Bogdan Ionuţ Gavrea; Assoc. Prof. Dr. Math. Adela Novac; Assoc. Prof. Dr. Math. Mircea Dan Rus; Assoc. Prof. Dr. Math. Ovidiu Furdui; Assist. Prof. Dr. Math. Adrian Holhos; Assist. Prof. Dr. Math. Adela Capătă

Representative projects

DynAPSNeur, "Dynamics Analysis of Parallel Simulations of Biological Neural Microcircuits", FP7 "Research Infrastructures" action (January 1 - December 30, 2013)
http://www.hp-see.eu/hp-see-pilot-call-awarded-applications
MoDef, "Modelling using advanced methods and techniques based on the theory of deformable surfaces with applications in computer assisted surgery and other modelling procedures of anatomic structures", PNII Partnership, http://dicomge.utcluj.ro/modef (2007-2010)
"Advanced Methods and Algorithms of Mathematics related to the Theory of Deformable Models, with applications in image processing and medicine", CNCSIS, (2006-2008)
"Denoising and compression of data on high-dimensional manifolds", Deutsche Forschung Gemeinschaft, Bilateral cooperation Germania – Romania PL 170/14-1, Georg Austin University, Göttingen, (January 1 - December 31, 2011)
"Denoising and compression of spherical data", *Deutsche Forschung Gemeinschaft* (2007 –2010),
DESPED, **"Stereo Based Object Tracking and Pedestrian Recognition in Traffic and Environments"**, *Wolkswagen*

AG, Germania (2006-2007) , (coord. professor Sergiu Nedevschi).
DESBOR, **"Recognition system for automatic cruise control in urban traffic environments",** *Volkswagen AG*, Germania (2005-2007) , (coord. professor Sergiu Nedevschi).
CRIOLAPSIM, **"Laparoscopic Cryosurgical Treatment of the renal tumors individualized using simulations on 3D reconstructed model"**, *CEEX* (2006-2008) director TUCN prof. dr. eng. Sergiu Nedevschi (in cooperation with "Institutul Clinic de Urologie şi Transplant Renal" Cluj-Napoca

Significant results

The most representative publications of the past 2 years

1. Gavrea, Ioan; Ivan, Mircea, An Answer to an Open Problem on the Multivariate Bernstein Polynomials on a Simplex RESULTS IN MATHEMATICS Volume: 74 Issue: 1 Article Number: UNSP 13 Published: MAR 2019
2. Furdui, Ovidiu; Ivan, Mircea; Sintamarian, Alina, A Limit of a Power of a Sum, AMERICAN MATHEMATICAL MONTHLY Volume: 126 Issue: 2 Pages: 187-187 Published: FEB 7 2019
3. Heilmann, Margareta; Rasa, Ioan, A Nice Representation for a Link Between Baskakov- and Szasz-Mirakjan-Durrmeyer Operators and Their Kantorovich Variants, RESULTS IN MATHEMATICS Volume: 74 Issue: 1 Article Number: UNSP 9 Published: MAR 2019
4. Popa, Dorian; Rasa, Ioan; Viorel, Adrian, Approximate solutions of the logistic equation and Ulam stability APPLIED MATHEMATICS LETTERS Volume: 85 Pages: 64-69 Published: NOV 2018
5. Gavrea, Ioan; Ivan, Mircea, A note on the fixed points of positive linear operators JOURNAL OF APPROXIMATION THEORY Volume: 227 Pages: 27-36 Published: MAR 2018
6. Berzig, Maher; Rus, Cristina Olimpia; Rus, Mircea Dan, An answer to an open problem of Jachymski JOURNAL OF FIXED POINT THEORY AND APPLICATIONS Volume: 19 Issue: 4 Pages: 2755-2761 Published: DEC 2017
7. I. Gavrea and M. Ivan, "On an Extension of Plya-SzegA Formula Concerning Sequences of Roots of Integrals", *Mediterranean Journal of Mathematics*, vol. 13, pp. 3409-3416, Oct 2016.
8. G. Mocanu and I. Rasa, "C (0)-Semigroups Associated with Markov Operators", *Mediterranean Journal of Mathematics*, vol. 13, pp. 353-363, Feb 2016.
9. I. Peter, et al.,"The epichaperome is an integrated chaperome network that facilitates tumour survival", *NATURE*, Vol.538, nr.30, pp.397-401, 2016.
10. I.Gavrea, M. Ivan, "A sharp estimate for the Peano error representation", in *Applied Mathematics and Computation*, vol. 252, 2015, pp.14-19
11. M. Ivan, "A note on the Hermite interpolation" in *Numerical algorithms*, vol. 69, no. 3, 2015, pp. 517-522
12. M. Calixto, J. Guerrero, and D. Rosca, "Wavelet transform on the torus: A group theoretical approach", *Applied and Computational Harmonic Analysis*, vol. 38, pp. 32-49, Jan 2015.
13. A. I. Mitrea: "On the dense unbounded divergence of the discrete best approximation", in *Taiwanese Journal of Mathematics*, vol.18, no.4, 2014, pp. 1119-1127
14. I. Mitrea: "On the topological structure of the set of singularities for interpolatory product integration rules", in *Carpathian Journal of Mathematics*, vol. 30, no. 3, 2014, pp. 355-360
15. I. Craciun, D. Inoan, D. Popa, and L. Tudose, "Generalized Golden Ratios defined by means", *Applied Mathematics and Computation*, vol. 250, pp. 221-227, Jan 2015.
16. D. Inoan, "An existence result for a variational-like inequality", in *Bull. Aust. Math. Soc.*, vol. 90, 2014, pp. 319–326
17. S. M.S.M Jung, D. Popa, M. T. Rassias, "On the stability of the linear functional equation in a single variable on complete metric groups", in *J. Glob.Optim.*, vol. 59, no. 1, 2014, pp. 165–171
18. A. Holhoş, D. Roşca, "An octahedral equal area partition of the sphere and near optimal configurations of points", in *Comput. Math. Appl.,* vol. 67, no. 5, 2014, pp.1092-1107
19. D. Marian, I. R. Peter, C. Pintea, "A class of generalize monotone operators", in *Journal of Mathematical Analysis and Applications*, vol 42, no. 2, 2015, pp. 1827-1843

The offer addressed to the economic environment

Research & development	Development of original solutions for modelling dynamic 3D environments; Development of real-time perception systems for structured or unstructured 3D environments, applied to driving assistance systems, autonomous robots, space observation, or computer assisted medical diagnosis.
Consulting	Consulting, design, research in pattern recognition, machine learning for multiple industrial and scientific fields.
Training	Image processing basics: Image processing algorithms and techniques, pattern recognition, machine learning, kernel methods with applications in different fields (computer vision, neuroscience, medical, speech recognition); Numerical optimization algorithms, time stepping schemes for rigid body systems with applications to robotics, autonomous navigation and granular materials.