BOOK OF ABSTRACTS

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INVITED SPEAKERS

Nonlinear Fokker–Planck equations

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In the mean field theory the Fokker-Planck equation describes the evolution of a probability density associated with a Markovian process with drift. Existence and long time behaviour (H-theorem) are surveyed.

Submanifolds of real codimension two in complex space forms

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In this lecture we present some classification theorems for submanifolds of real codimension two of a complex space form under the algebraic condition on the two geometric structures: a submanifold structure, represented by the second fundamental tensor and the endomorphism induced from the almost complex structure of the ambient space on the tangent bundle of the submanifold. When the ambient manifold is a complex Euclidean space, we also study particular cases: when there exists a totally geodesic or a totally umbilical hypersurface of a complex Euclidean space such that a submanifold is its hypersurface and we obtain the complete classification of such submanifolds. Further, we present some interesting formulae for hypersurfaces of the product of two odd-dimensional spheres in order to apply the obtained results to submanifolds of real codimension two of a complex projective space. Namely, H.B. Lawson was the first one to exploit the idea to regard a complex projective space as a projection from the sphere to study a hypersurface in a complex projective space

by lifting it to a hypersurface of the sphere. A typical example of a real hypersurface of a complex projective space is defined as a projection of the product of two odd-dimensional spheres in a unit sphere. We study submanifolds of real codimension two of a complex projective space, such that there exists a real hypersurface, the above mentioned typical example, such that a submanifold is its hypersurface and we prove that such a submanifold is the image of the product of three odd-dimensional spheres. This talk is based on joint research with M. Okumura.

Grassmann geometry of surfaces in 3-dimensional homogeneous spaces

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In this talk I give a survey on Grassmann geometry of surfaces in 3-dimensional homogeneous spaces. This talk is based on joint work with Hiroo Naitoh.

Construction of new minimal surfaces in Euclidean space

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The Björling problem consists of finding a minimal surface in Euclidean space containing a given curve and a prescribed unit normal vector field to the surface along this curve. Under holomorphic assumptions, Schwarz proved local existence obtaining an expression of the parametrization of the minimal surface involving nothing but integrals and analytic continuation of the initial data. Although this parametrization is simple, only a few number of explicit parametrizations of minimal surfaces are known in the literature. In this talk we provide many and new explicit examples of minimal surfaces by solving the Björling problem for a large class of curves.

Remarks on the geometry of complete non-compact Finsler manifolds

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The theory of geodesics is a powerful tool to investigate the geometry of Riemannian and Finsler manifolds. In this talk we will discuss the Busemann function and the relation between the copoints set and the cut locus of a closed subset of a Riemannian or Finsler manifold. Examples and application are also shown as well as some connections with the topology of the manifold.

Sturm-Liouville operators and boundary triplets

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The talk will be an overview of boundary triplets and the corresponding Weyl functions for symmetric operators. The main example is the case of one-dimensional Sturm-Liouville operators. In particular, the semi-bounded case will be considered. This is a joint work with Jussi Behrndt (T.U. Graz) and Seppo Hassi (University of Vaasa).

Generalized Kähler geometry: related structures and submanifolds

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Generalized Kähler geometry appeared in physics, in the study of supersymmetries in string theory, and was interpreted by geometers as a geometric structure on the tangent-plus-cotangent bundle. In our talk, after a recall of generalized Kähler structures, we give a description of Kähler-related, generalized structures: CRF, CRFK

(Cauchy-Riemann-Yano-Kähler) and almost contact (metric, normal, binormal, Sasakian) structures. Then, we establish the conditions for a submanifold (in particular, a hypersurface) of a generalized Kähler manifold to carry an induced CRFK structure.

Lagrangian submanifolds of the homogeneous nearly Kähler S^3 x S^3

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In this talk we will recall the basics about the homogeneous nearly Kähler manifold $S^3 \times S^3$ and then study its Lagrangian submanifolds. We discuss examples as well as the main tools which are useful in this study, in particular the so-called angle functions, and we classify those Lagrangian submanifolds for which one or more angle functions are constant.

Series of convex functions with applications to Statistical Mechanics

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Consider f, f_n proper convex functions defined on a Banach space X such that

$$f(x) = \sum\nolimits_{n\geq 1} f_n(x) \quad (x \in X).$$

X. Y. Zheng (1998) showed that the subdifferential $\partial f(x)$ of f at x is given by the formula

$$\partial f(x) = w^*\text{-}\sum\nolimits_{n\geq 1} \partial f_n(x)$$

for all $x \in \operatorname{int}(\operatorname{dom} f)$ whenever f and f_n are continuous on $\operatorname{int}(\operatorname{dom} f)$.

Besides showing that the above result remains true in locally convex spaces, we prove that

$$f^*(x^*) = \min\left\{ \sum\nolimits_{n\geq 1} f_n^*(x_n^*) \mid x_n^* \in \operatorname{dom} f_n^* \ \forall n \geq 1,\ x^* = w^*\text{-}\sum\nolimits_{n\geq 1} x_n^* \right\}$$

for all $x^* \in \partial f(\operatorname{int} \operatorname{dom} f)$ under the same conditions on f and f_n.

Then we apply the previous results for studying rigorously the entropy maximization problem in the case of ideal gases. A complete study is done in the case of Maxwell–Boltzmann entropy.

The presentation is based on the articles [2] and [4].

[1] R. K. Pathria, P. D. Beale, *Statistical Mechanics*, 3rd edition, Elsevier Ltd. (2011).

[2] C. Vallée, C. Zălinescu, *Series of convex functions: subdifferential, conjugate and applications to entropy minimization*, J. Convex Anal. 23(4) (2016), 1137-1160.

[3] C. Zălinescu, *Convex Analysis in General Vector Spaces*, World Scientific, New Jersey, 2002.

[4] C. Zălinescu, On the entropy minimization problem in Statistical Mechanics, J. Math. Anal. Appl. 2016 DOI: 10.1016/j.jmaa.2016.10.020.

[5] X. Y. Zheng, *A series of convex functions on a Banach space*, Acta Mathematica Sinica, New Series 14 (1998), 77–84.

CONTRIBUTED TALKS

Finsler-type connections in generalized Lagrange spaces

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The efforts made in defining a covariant derivative and accordingly, a parallel displacement in Finsler space led to a concept generically called a Finsler connection. Among the Finsler connections there exist four, which are remarkable by their properties named the Cartan, Berwald, Chern-Rund and Hashiguchi connections, respectively. The Finsler connections are also suitable for the geometries more general than the Finslerian one as the Lagrange geometry or generalized Lagrange geometry introduced by Radu Miron an intensively studied by him and his collaborators. Our purpose is to discuss the Finsler connections in the generalized Lagrange space. These will be called Finsler-type connections. A special attention will be paid to the Chern-Rund connection.

Consonant families of sets

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Let (X, τ) be a topological space and $\mathcal{P}_0(X)$ the family of all non-void subsets of X. Due to their special properties some of the highly studied topologies on $\mathcal{P}_0(X)$ are Fell τ_F, Vietoris τ_V and Kuratowski τ_K topologies. A family of sets $\mathcal{A} \subset \mathcal{P}_0(X)$ is consonant iff the Fell and Kuratowski topologies coincide on $\mathcal{A}$. Because $\tau_F \preceq \tau_K \preceq \tau_V$ a particular situation of consonant family occurs when Fell and Vietoris topologies agrees.

Harmonicity of the cotangent bundle

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Different from the total space of the tangent bundle TM of a Riemannian manifold (M, g), which is endowed with Sasaki metric G, the complete lift metric g^c, Oproiu's metrics, general natural metrics, the natural diagonal metrics, Cheeger-Gromol metrics and so on, the total space of the cotangent bundle T^*M is not so rich in metric structures. The classical Riemann extension (introduced by Patterson-Walker, Willmore) and their generalizations (such as the natural Riemann extension introduced by Sekizawa and Kowalski) are some examples of metrics on T^*M. We use such metrics here in the context of harmonicity. This presentation is based on [1] and [2].

[1] C.-L. Bejan, Ş. E. Meriç, E. Kılıç, *Einstein Metrics Induced by Natural Riemann Extensions*, Advances in Applied Clifford Algebras, (27) 2017, 2333–2343.

[2] C.-L. Bejan, O. Kowalski, *On some differential operators on natural Riemann extensions*, Annals of Global Analysis and Geometry, 48 (2015), 171–180.

Dissipative Lagrangian systems. Helmholtz conditions and formal integrability

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We provide necessary and sufficient conditions (of Helmholtz-type) for a system of second order differential equations (SODE) to represent the Lagrange equations for some dissipative forces. We obtain the obstructions to the formal integrability of these Helmholtz conditions and as a consequence we show that any 2-dimensional SODE is of dissipative type.

Existence for delay inclusions involving measures

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The aim of this lecture is to present an existence result for $\mathcal{L}^\infty$-solutions for a class of semilinear delay evolution inclusions with measures and subjected to nonlocal initial conditions.

Stability of control structures using alternate feedback

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The paper deals with a nonconventional control structure defined and introduced by the author in theory and practice of control structures so called "alternate feedback". The control system becomes strongly nonlinear with differential inclusions and from the structural point of view with sliding modes. The stability is treated via Popov asimptotic hyperstability theory in order to find proper controllers. The chattering fenomenon is analysed by simulation and illustrative practical experiments to "round research" are available too.

Some new results on slant immersions into an almost contact metric manifold

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The notion of a slant submanifold of an almost Hermitian manifold was introduced by B.Y. Chen. After, A. Lotta defined and studied the concept of a slant immersion into an almost contact metric manifold. In this talk we present some new results concerning slant submanifolds of an almost contact metric manifold belonging to a suitable Chinea-Gonzalez class, taking into account the position of the Reeb vector field of the ambient space with respect to the considered submanifolds.

Unexpected applications of Brouwer's fixed point theorem

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Drawing from topology and literature, this paper seeks to show how the key factors involved in the experience of poetry may be illustrated using Brouwer's fixed point theorem. Its aim is to provide a cross-disciplinary framework which allows both the entering of poetry through mathematics and the entering of mathematics through poetry.

Monotone and convex functions of matrices and operators, Jensen type inequalities with operators on Hilbert spaces

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Order relations between (positive) matrices and operators were defined and studied in many articles and monographs. They are also related to the means of matrices and operators and to monotone functions with matrix and operator arguments. Such issues are approached in the first section of this paper and certain connections between some properties involving means and monotone functions are investigated. The A, G, and H means of operators acting on Hilbert spaces were also considered and studied in several articles, for instance in a paper of 2011 due to three Croatian authors. Convex functions of selfadjoint operators were implied in an inequality due to B. Mond and J. Pečarić, which represents an operator version of the classical J.L.W.V. Jensen's inequality (Acta Mathematica, 1906), and it is extended to several operators whose spectra are included in a closed interval $[m, M]$. In the second section of this paper there are studied just properties of H-space operators involving their spectra, for instance the connection between the spectra of an operator A and $\varphi(A)$, where φ is a polynomial function. Other inequalities with operators under convex functions, including Jensen type inequalities, are studied in the third and last section of the paper.

Alternative Lagrangians obtained by scalar deformations

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We consider a system of SODE in normal form, which is equivalent with the system of Lagrange equations of some Lagrangian L, system that includes a covariant force field. We determine necessary and sufficient conditions for the existence of a differentiable real function f such that the initial system will be equivalent with the system of Euler-Lagrange equations of the deformed Lagrangian $f(L)$. We give various examples of such scalar deformations f.

A characterisation for Finsler spaces of constant flag curvature and how Beltrami theorem could work in Finsler geometry

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We define a Weyl-type curvature tensor that provides a characterisation for Finsler spaces of constant flag curvature. When the Finsler space reduces to a Riemannian one, the Weyl-type curvature reduces to the classic projective Weyl tensor. In the general case, the Weyl-type curvature tensor differs from the Weyl projective curvature, it is not a projective invariant, and hence Beltrami theorem does not work in Finsler geometry. We provide the relation between the Weyl-type curvature tensors of two projectively related Finsler spaces. Using this formula we show that a projective deformation preserves the property of having constant flag curvature (Beltrami theorem works) if and only if the projective factor satisfies some Euler-Lagrange equation.

(α,ε)-structures of natural lift type on the tangent bundle

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We give a unified presentation for the four types of (α, ε)-structures on the tangent bundle of a Riemannian manifold, whose $(1,1)$-tensor field and metric are constructed as general natural lifts of the metric from the base manifold. More exactly, we provide a unified characterization for the general natural almost Hermitian and almost para-Hermitian structures, and another one for the general natural almost product and almost anti-Hermitian (Norden) structures. Then, by imposing the integrability of the$(1,1)$-tensor field, we obtain the general natural Hermitian, para-Hermitian, product Riemannian and anti-Hermitian structures, which exist only on the tangent bundle of a Riemannian space form. Moreover, studying the closedness of the associated 2-form we characterize the general natural (α, ε)-structures of (almost) Kahler type on the tangent bundle of a Riemannian manifold.

On constant mean curvature biharmonic surfaces

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We present explicit examples of CMC biharmonic tori and a classification result for biharmonic surfaces with parallel mean curvature vector field (PMC) in complex space forms.

Applications of some higher-order derivatives to generalized optimization problems

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In this talk we define some notions of higher-order derivatives for set-valued maps and we obtain basic calculus rules for them under metric subregularity conditions. Then, as applications of these calculus rules, we get optimality conditions for minimizers in vector optimization with variable ordering structure, that is, in the case where efficiency is taken with respect to an order given by a set-valued map having as values closed convex pointed cones.

Compactness in Sobolev spaces

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We study some compactness conditions with respect to the topology of convergence in measure on Sobolev spaces. The results will be used to solve certain variational calculus problems.

Scalar-Weyl structures in generalized Lagrange geometries and compatible connections

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Scalar-Weyl structures and their compatible linear connections are introduced in the setting of generalized Lagrange geometry as a natural generalization of similar notions from semi-Riemannian and Finsler geometries. As an example, it is discussed

a generalized Lagrange metric used by R. Miron in a geometric framework unifying gravitation and electromagnetism.

Effects of gravitational resonances in the space debris problem

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Due to the serious threat to the space assets as well as to the current and future missions, including the human operated spacecraft, the debris problem is on the frontispiece of the present space research. On the theoretical side, it is very important to understand the global dynamics of this population in each specific region of the sky for devising mitigation and maintenance strategies. In this talk, we describe several recent results describing the dynamics of resonances within LEO, MEO and GEO regions. We provide a description of the main dynamical features of the resonances, highlighting the phenomena occurring in each region of the sky. In particular, in the LEO region we discuss the interplay between the conservative and dissipative effects and we show that the orbital decay, caused by the air drag, can be balanced by resonant effects. In MEO and GEO, we show the existence of various dynamical phenomena such as splitting and overlapping of resonances, chaotic variations of the orbital elements, bifurcations, variations of the amplitude of resonances with respect to various parameters etc. This talk refers to several works in collaboration with Alessandra Celletti.

A crossover: dynamics of mutualistic interactions in terms of reproductive ratios

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We propose a general class of two-dimensional models of facultative mutualism which encompasses a significant amount of concrete ones in common use. Using mild assumptions on the growth and self-limiting functions, we establish necessary and sufficient conditions for the boundedness of model solutions and prove the global stability of a unique coexistence equilibrium whenever the latter exists. These conditions are stated in terms of reproductive parameters which are similar in scope to the basic reproduction number of current use in Epidemiology, but are computed at high population densities, rather than in near-extinction conditions. Our framework allows each

of the mutualists to be subject to a weak Allee effect. Moreover, we find that if one of the interacting species is subject to a strong Allee effect, then the mutualism can overcome it and cause a unique coexistence equilibrium to be globally stable.

Integro-differential evolution equation with measures

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The goal of the paper is to prove some sufficient conditions for the local, or global existence of the $\mathcal{L}^\infty$-solution for the integro-differential Cauchy problem

$$du = \left(Au + \int_a^t k\left(t, \tau, u\left(\tau\right)\right) d\tau \right) dt + dg, u\left(a\right) = \xi,$$

where X is a real Banach space, $A : D\left(A\right) \subseteq X \to X$ is the infinitesimal generator of a C_0-semigroup of contractions $\left\{S\left(t\right); t \geq 0\right\}$, with $R\left(\lambda, A\right) = \left(\lambda I - A\right)^{-1}$ compact operator for each $\lambda > 0$, $\xi \in X$, $g \in BV\left(\left[a, b\right]; X\right)$ and $k : \Delta_{[a,b]} \times U \to X$ is a continuous function, while $\Delta_{[a,b]} = \left\{(s, \tau) \in \mathbb{R}^2; a \leq \tau \leq s \leq b\right\}$, U is a nonempty and open subset in X. Also, we present the main results concerning saturated $\mathcal{L}^\infty$-solution for the above integro-diferential Cauchy problem. An example of integro-differential Cauchy problem involving the Dirac measure concentrated at point is also included.

Bi-slant submanifolds in metallic Riemannian manifolds

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In this paper we define and study bi-slant submanifolds in metallic Riemannian manifolds. We find examples and integrability conditions for the distributions which are involved in such types of submanifolds. Moreover, we study particular classes of these submanifolds.

A Bochner technique on holomorphic Lie algebroids

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We describe a Bochner-type study for holomorphic horizontal vector fields defined on a holomorphic Finsler algebroid E. We use a Laplace-type horizontal operator for forms defined on the prolongation of such an algebroid. We obtain in this setting a vanishing theorem for horizontal fields with compact support on E.

Algorithmic complexity of stochastic matrix decompositions

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A stochastic matrix is represented by a square matrix with positive elements that has the sum of the elements from each row equal to one. It can be regarded as a probability transition matrix for a Markov stochastic system. In [1] it was proved that the probability transition matrix can be decomposed related to its eigenvalues. Also, in [1] and [2] it was shown how to find the transient and differential matrices that determine this decomposition. In this context, we rebuild these algorithms in order to minimize their computational complexity, involving the recent optimized methods for matrix multiplication, characteristic polynomial determination and matrix polynomial! resuming. Also, various aspects of parallelization are used and computing accuracy is studied.

[1] A. Lazari, *Algorithms for Determining the Transient and Differential Matrices in Finite Markov Processes*, Bulletin of the Academy of Science of RM, Mathematica, 2(63), 2010, p. 84-99.

[2] A. Lazari, D. Lozovanu, *An approach for determining the matrix of limiting state probabilities in discrete Markov processes*, Bulletin of the Academy of Science of RM, Mathematica, 1(62), 2010, p. 77-91.

About the immune system dynamics

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The answer of the immune system against a target population is a dynamic process. We present some results concerning the mathematical modelling of these phenomena.

Multivalued backward stochastic differential equations of anticipated type

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We show the existence and uniqueness of the strong solution for the the anticipated backward stochastic differential equations (BSDEs) driven by oblique subgradients:

$$\begin{cases} -dY_t + H(t)\partial\varphi(Y_t)dt \ni f(t, Y_t, Z_t, Y_{t+\delta(t)}, Z_{t+\eta(t)})dt - Z_t dB_t\,, \quad t \in [0,T], \\ Y_t = \xi_t\,, \quad Z_t = \zeta_t\,, \quad t \in [T, T+\ell], \quad \mathbb{P}\text{–a.s.} \end{cases}$$

We also provide an example of an anticipated BSDE with time-dependent convex constraints, which can be reduced to our equation.

Reaction-diffusion systems: controlability, stabilization, inverse problems

Elena-Alexandra MELNIG
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In this talk we consider a class of reaction-diffusion systems and more general systems of coupled semilinear parabolic equations. We survey first some results concerning Carleman estimates and controllability. We prove feedback stabilization with simultaneous control. We also obtain Lipschitz stability estimates in associated inverse source problems.

Curves in a Myller configuration

Gabriel MACSIM, **Adela-Gabriela MIHAI**[1], Andreea OLTEANU
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We consider special curves in a Myller configuration and study their properties.

[1] R. Miron, *Geometry of Myller Configurations*, Ed. Acad. Romane, 2010.

[2] M. Lipschutz, *Theory and Problems of Differential Geometry*, Schaum's Outline Series, McGraw-Hill. Inc., 1969.

Applications of generalized Poincaré inequalities on metric measure spaces

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We present geometric and analytic consequences of Poincaré inequalities based of Banach function spaces on metric measure spaces, including the quasiconvexity of the metric space, the density of Lipschitz functions in Sobolev-type spaces and the Hölder continuity of Orlicz-Sobolev functions.

Contact CR submanifolds in S7

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In this talk we present some results on contact CR submanifolds in the seven dimensional sphere endowed with the standard Sasakian structure. We completely classify these submanifolds when additional geometric conditions are imposed. Such conditions come out when the equality sign in some Chen's inequalities holds. On the other hand, we define the analogue of mixed totally geodesic contact CR submanifolds in $S7$ and classify them.

On biconservative surfaces in space forms

Simona NISTOR
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In this talk, we review recent results concerning biconservative surfaces in space forms. First, we present general properties of biconservative surfaces in arbitrary Riemannian manifolds, and then we focus on biconservative surfaces in three and in four dimensional space forms.

CMC biharmonic surfaces in spheres

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In this talk we review some results concerning the classification of CMC biharmonic surfaces of constant Gaussian curvature in spheres.

On metallic shaped hypersurfaces

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We consider metallic shaped hypersurfaces in real space forms and Lorentzian space forms. We give the classification of these kind of hypersurfaces. We also deduce that these hypersurfaces are pseudosymmetric.

Single-valued perturbed delay systems with nonlocal initial data

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We present an existence and uniform asymptotic stability result for a single-valued perturbed nonlinear delay system with nonlocal initial data. An application to specific reaction-diffusion system is included.

Obstacle problems for parabolic SDEs with Hölder continuous diffusion: from weak to strong solutions

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The article focuses on the qualitative analysis of a stochastic variational inequality considered in a Gelfand-Lions triple space setup $V \subset H \subset V^*$. We study the existence and uniqueness of a strong solution under the assumption of Hölder continuity for the diffusion coefficient of our obstacle problem. Imposing some weaker assumptions on the barriers, we provide the existence of an weak variational solution for the multi-valued problem. Moreover, the asymptotic behavior of the solution and a maximum principle are provided.

The square root of nonnegative linear relations

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The main goal of this talk is to present an elementary proof of the existence and uniqueness of the square root in the context of nonnegative selfadjoint linear relations on real or complex Hilbert spaces.

On g-differential equations and Stieltjes integral

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A g-differential equation is a differential equation with the g-derivative instead of the usual derivative (as introduced by Pouso and Rodriguez [2]). Such equations generalize usual differential equations and equations with impulses and have also been studied by Frigon and Pouso [1] in the case of a non-decreasing function g. We present conditions to ensure that a g-differential equation is equivalent to an integral equation involving the Kurzweil-Stieltjes integral, under much more general assumption on the function g (which is supposed to be of generalized bounded variation).

This is a joint work with G.A. Monteiro, Czech Academy of Science, Prague.

[1] M. Frigon, R. Lopez Pouso, *Theory and applications of first-order systems of Stieltjes differential equations*, Advances in Nonlinear Analysis, 6 (1) 2016.

[2] R. Lopez Pouso, A. Rodriguez, *A new unification of continuous, discrete, and impulsive calculus through Stieltjes derivatives*, Real Analysis Exchange, 40 (2015), 319–354.

[3] G. Antunes Monteiro, B. Satco, *Distributional, differential and integral problems: equivalence and existence results*, Electronic Journal of Qualitative Theory of Differential Equations, 7 (2017), 1–26.

A comparison of some numerical methods for semiconductor device problem

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The considered problem consists in determination of semiconductor diode parameters. The mathematical formulation of the problem is based on Drift-Diffusion model. The model is given by a set of equations for three unknown functions: the electrostatic potential, the concentrations for electrons and holes. The problem is solved numerically on Scharfetter-Gummel discretixation, by means of Conjugate Gradient and Gauss-Jordan methods. As the equations are strongly nonlinear, then in order to obtain the convergent solution we apply the iterative procedure that consist in gradually

increasing of the input voltage with small step. The obtaining solutions are used for equation linearization.

Second order deformation of complex Finsler metrics

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In this paper we continue the study of the deformation of complex Finsler functions. We build the infinitesimal variation of an already deformed metric. In the space obtained through this process, we can induce some non-linear connections besides the implicit ones. We are interested in finding relations between them. In the second part of this work, we investigate a 1-parameter family of complex Finsler functions. The first and the second order infinitesimal deformation of this family are the previously studied metrics. We prove that in this manifold the Chern-Finsler connection is related to the infinitesimal deformation of the non-linear connections. Our purpose is to establish sufficient and necessary conditions such that this space is purely Hermitian, Kähler, Berwald or respectively, a generalized Berwald.

Connections between mathematical formalizations of noise in neural dynamics

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We highlight a theoretical connection between two models that correspond to two different ways of noise implementation in neural dynamics. We find integral transforms that map the probability density functions associated to the escape rate model and noisy leaky integrate and fire model one-to-another.

Timelike slant geometry on spacelike submanifolds of codimension two

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In this talk which is based on a joint work with Shyuichi Izumiya, we construct timelike slant geometry on spacelike submanifolds of codimension two in Lorentz-Minkowski space, [5]. Thus, we generalize some of the results which were obtained in [2]. Then, we interpret the results which were given in [1], [3] and [4] as special cases of our results. Next, we investigate spacelike curves in Lorentz-Minkowski 3-space from different viewpoints as another special case.

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[3] S. Izumiya, H. Yıldırım, *Extensions of the mandala of Legendrian dualities for pseudospheres in Lorentz-Minkowski space*, Topology and its Applications, 159 (2012), 509–518.

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BSDEs with time–delayed generators in the study of path–dependent nonlinear Kolmogorov equations

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We study the existence and uniqueness for a path-dependent nonlinear Kolmogorov equation. Our approach is based on a Feynman-Kac representation formula, which connects this PDE with a backward stochastic differential equation (BSDE) with time-delayed generators.