

Secțiunea: Doctorat

Sala 'e'

Clădirea Mathematica, str. Ploiești 23-25, Cluj-Napoca

sau

online prin Zoom

<https://zoom.us/j/8105549607?pwd=a1ozZkkzdHdCRnBRS2YrT0FwQTB2dz09>

Departamentul de Matematică, Facultatea de Matematică și Informatică



10:45 mini-prăjituri		
11:00	Mihai Aron	Noi clase de funcții univalente folosind un nou operator diferențial
11:20	Anamaria Paștiu	The univalence criteria based on the theory of Loewner chains on the unit ball of \mathbb{C}^n
11:40	Eduard Grigoriuc	The Graham-Kohr extension operator in complex Banach spaces
12:00	Andra Malina	Spherical interpolation of scattered data using least squares thin-plate spline and inverse multiquadric functions
Pauză / Discuții		
12:40	Andrei Gasparovici	Mixed Dirichlet-Robin problem for coupled anisotropic Darcy-Forchheimer-Brinkman equations
13:00	Teodora Baci	Conditions for the eradicability of an alien population by regional controls in a reaction-diffusion system
13:20	Andra Maria Stoica	On minimal quasi-isometric dilations for operators similar to contractions
13:40	Lehel Csillag	(Non-Relativistic) Schrödinger Connections: From Mathematical Foundations Towards Yano-Schrödinger Cosmology
Pauză / Discuții		
14:20	Georgiana Fasolă	On the Chermak-Delgado lattice of a finite group
14:40	Cristian Rafiliu	O caracterizare a obiectelor Σ -pur-injective în categorii triangulate
15:00	Valerian Alin Fodor	The projected regions over the faces of a polyhedron
15:20	Bogdan Daniel Moldovan	Conditions for the preservation of Motzkin decomposability and the Pareto bordered property under addition
Poză + mini-ceremonie de închidere		

ABSTRACTE

11:00 **Mihai Aron** (Universitatea Babeş-Bolyai, Cluj-Napoca)

11:20

Titlu: Noi clase de funcții univalente folosind un nou operator diferențial

Îndrumător: Prof. Mirela Kohr

Abstract: Cu ajutorul unui operator definit în conformitate cu ideea dintr-o teoremă de tip Marx-Strohhäcker, obținem noi clase de funcții univalente, sau mai general, un nou criteriu de univalență pentru funcțiile analitice normate. De asemenea, determinăm estimări ale coeficienților funcțiilor din aceste clase, studiem atât problema Fekete-Szegő pentru acestea, cât și coeficienții logaritmici ai acestor funcții.

11:20 **Anamaria Paștiu** (Universitatea 'Babeş-Bolyai', Cluj-Napoca)

11:40

Titlu: The univalence criteria based on the theory of Loewner chains on the unit ball of \mathbb{C}^n

Îndrumător: Prof. Mirela Kohr

Abstract: We present various univalence criteria for holomorphic mappings on the unit ball \mathbb{B}^n in \mathbb{C}^n . We use several results related to the Loewner chains and the Loewner differential equation on the ball \mathbb{B}^n in \mathbb{C}^n .

11:40 **Eduard Grigoriuc** (Universitatea 'Babeş-Bolyai' & Institutul de Calcul 'Tiberiu Popoviciu', Cluj-Napoca)

12:00

Titlu: The Graham-Kohr extension operator in complex Banach spaces

Îndrumător: Prof. Mirela Kohr

Abstract: We focus our attention on the Graham-Kohr extension operator and its properties on different domains in complex Banach spaces. The main result consists in proving that the Graham-Kohr extension operator preserves the notion of g -Loewner chain (in particular, the g -starlikeness, spirallikeness and other geometric properties are preserved from the unit disc to complex Banach spaces).

12:00 **Andra Malina** (Universitatea 'Babeş-Bolyai' & Institutul de Calcul 'Tiberiu Popoviciu', Cluj-Napoca)

12:20

Titlu: Spherical interpolation of scattered data using least squares thin-plate spline and inverse multiquadric functions

Îndrumător: Conf. Teodora Cătiuaș

Abstract: We consider the problem of interpolating large sets of scattered data on a sphere by means of some modified Shepard operators, using two zonal basis functions: the least squares thin-plate spline and the inverse multiquadrics. We study some properties of the combined operators proposed and present several numerical experiments, performed on test functions and on some real data applications.

12:40
13:00 **Andrei Gasparovici** (Universitatea Babeş-Bolyai, Cluj-Napoca)

Titlu: **Mixed Dirichlet-Robin problem for coupled anisotropic Darcy-Forchheimer-Brinkman equations**

Îndrumător: Prof. Mirela Kohr

Abstract: We study mixed Dirichlet-Robin boundary value problems for the nonlinear anisotropic Darcy-Forchheimer-Brinkman system and a system of coupled Darcy-Forchheimer-Brinkman equations using a variational approach and fixed-point techniques. We also provide applications and numerical results related to viscous incompressible fluid flows in multidisperse porous media.

13:00
13:20 **Teodora Baciu** (Universitatea 'Alexandru Ioan Cuza', Iași)

Titlu: **Conditions for the eradicability of an alien population by regional controls in a reaction-diffusion system**

Îndrumător: Prof. Sebastian Anita

Abstract: We investigate a controlled reaction-diffusion system modeling the interactions between predator and prey populations, which inhabit a defined habitat $\Omega \subset \mathbb{R}^N$. The predator population is influenced by a control term within a subset $\omega \subset \Omega$. Our study establishes the existence and uniqueness of the solution for the prey-predator system and identifies a sufficient condition for the extinction of the predator population. We also explore the reverse scenario, where the predator population tends towards zero, considering potential connections with the sufficiency. Both scenarios are closely tied to the sign of two eigenvalues associated to some suitable eigenvalue problems.

13:20
13:40 **Andra Maria Stoica** (Universitatea 'Lucian Blaga', Sibiu)

Titlu: **On minimal quasi-isometric dilations for operators similar to contractions**

Îndrumător: Prof. Laurian Suciuc

Abstract: The results are based on the classical dilation theory for contractions of B. Sz.-Nagy and C. Foias. We study the linear operators on Hilbert spaces having dilations to quasi-isometries. A bounded and linear operator S is said to be a quasi-isometry if S acts as an isometry on its range. We use the matrix method to study these operators. The class of operators that can be dilated to quasi-isometries is exactly the class of operators similar to contractions. Some special cases are also treated where the dilation has the Sz.Nagy-Schaffer's form as in the case of contractions. Minimal quasi-isometric dilations are characterized and examples are also provided. Our results enhance the classical, isometric dilation theory of contractions and leads to the study of new problems in operator interpolation. Joint work with Laurian Suciuc from Lucian Blaga University of Sibiu.

13:40 **Lehel Csillag** (Universitatea 'Babeş-Bolyai', Cluj-Napoca)
14:00

Titlu: **(Non-Relativistic) Schrödinger Connections: From Mathematical Foundations Towards Yano-Schrödinger Cosmology**

Îndrumător:

Abstract: In the present paper we introduce a novel coordinate-free formulation of Schrödinger connections, which are a special class of affine connections, first considered by Schrödinger. After recasting some basic properties in a differential geometric language, we show that Schrödinger connections can be realized through torsion, non-metricity or both. We then calculate the curvature tensors of Yano-Schrödinger geometry, realized by a semi-symmetric type of torsion, and we prove an existence theorem of generalized Einstein manifolds with torsion. Since Schrödinger connections preserve the lengths of vectors that are autoparallely transported, we employ them to derive the Raychaudhuri and Sachs equations in our proposed geometry, expanding upon previous work to include a Lagrangian formulation to the case of null congruences. To show applicability of Schrödinger connections in physics, we first propose a gravitational theory based on Yano-Schrödinger geometry, and construct a specific cosmological model, in which dark energy could be interpreted as a geometric effect. The predictions of the theory are compared with observational data for the Hubble function, and with the standard Λ CDM paradigm. To conclude our work, we take a metric-affine approach, find the hypermomentum, which sources Yano-Schrödinger connections, and develop a novel cosmological hyperfluid model within the considered geometry.

Our results show that gravity based on a Yano-Schrödinger connection could be a physically plausible extension of standard general relativity.

14:20 **Georgiana Fasolă** (Universitatea 'Alexandru Ioan Cuza', Iaşi)
14:40

Titlu: **On the Chermak-Delgado lattice of a finite group**

Îndrumător: Prof. Marius Tărnăuceanu

Abstract: In this talk, we present some recent results on the Chermak-Delgado lattice associated to a finite group. More precisely, we classify the finite groups with a small number of subgroups not in the Chermak-Delgado lattice. We also study the subgroups of minimum Chermak-Delgado measure.

14:40 **Cristian Rafiliu** (Universitatea 'Babeş-Bolyai', Cluj-Napoca)
15:00

Titlu: **O caracterizare a obiectelor Σ -pur-injective în categorii triangulate**

Îndrumător: Prof. Simion Breaz

Abstract: Dacă M este un R -modul drept, într-o ipoteză de teoria mulțimilor este cunoscut faptul că $Add(M) \subseteq Prod(M)$ dacă și numai dacă M este Σ -pur-injectiv. Vom prezenta un rezultat similar, dar în cazul mai general unde M este un obiect într-o categorie triangulată compact generată cu coproduse mici.

15:00 **Valerian Alin Fodor** (Universitatea 'Babeş-Bolyai', Cluj-Napoca)

15:20 Titlu: **The projected regions over the faces of a polyhedron**

Îndrumător: Conf. Cornel Pinte

Abstract: We characterize analytically the closure of the regions of \mathbb{R}^n which are projected over the relative interiors of some faces of a polyhedral set, through the metric projection of the polyhedral set itself. We show that these regions are polyhedral sets by explicitly characterizing them through systems of linear inequalities.

The action of the metric projection over the polyhedral set, restricted to precisely such a region, is showed to be the same as the one over the affine hull of the considered face.

15:20 **Bogdan Daniel Moldovan** (Universitatea 'Babeş-Bolyai', Cluj-Napoca)

15:40 Titlu: **Conditions for the preservation of Motzkin decomposability and the Pareto bordered property under addition**

Îndrumător: Conf. Cornel Pinte

Abstract: We provide some sufficient conditions on pairs of Motzkin decomposable sets and Pareto bordered sets in order to get the Minkowski sum of their components Motzkin decomposable and Pareto bordered respectively. We also prove that minimal faces of a closed convex set are also extreme faces of the set and vice-versa. This result allows us to define the generalized Minkowski sets by using the extreme faces. A Minkowski type theorem is proved with extreme faces playing the role of the extreme points in the classical Minkowski Theorem. The special class of Pareto bordered sets, which is a subclass of that of generalized Minkowski sets, is also taken into account. Indeed, as mentioned above, we show that the Minkowski sum of some Pareto bordered sets with the same lineality remains Pareto bordered. Note that the class of generalized Minkowski sets is not closed with respect to the Minkowski sum. It is however worth to mention that the class of closed convex sets which are both Motzkin decomposable and generalized Minkowski (or shortly, M dgM sets) is closed both with respect to Minkowski sum and Cartesian product [J. E. Martinez-Legaz, C. Pinte, Closed convex sets that are both Motzkin decomposable and generalized Minkowski sets, J. Nonlinear Var. Anal. 8 (2024), No. 4, pp. 571-579].
