İZMİR MATHEMATICS DAYS - IV

JUNE 15-17, 2022

İzmir Institute of Technology

For registrations and all information
Visit: https://img.iyte.edu.tr/

Venue: Online
Registration Deadline
With presentation: 20 May 2022
Without presentation: 1 June 2022

Invited Speakers

İzzet Coşkun	*University of Illinois at Chicago*
Türkü Özlüm Çelik	*Boğaziçi University*
Burak Erdoğan	*University of Illinois at Urbana-Champaign*
Cihan Okay	*Bilkent University*
Sinem Onaran	*Hacettepe University*
Türker Özsarı	*Bilkent University*
Jan Stovicek	*Charles University*
Julian Weight	*Aalto University*
Joshua Zahl	*University of British Columbia*

İzmir Mathematics Days - IV

Abstract Book

İzmİr Institute of Technology
June 15-17, 2022

Dear Participants,

"İzmir Mathematics Day" is an annual event organized by different universities in İzmir. It brings together distinguished mathematicians from our country and abroad with students and young researchers. One of the main goals of İzmir Mathematics Days is to create a platform where students and young researchers can share their studies, ideas and experiences, and can develop their research and mentor networks. Other aims are to introduce undergraduate and graduate students with new and interesting topics in advanced and modern mathematics and to encourage them to pursue a career as a researcher in mathematics or other related sciences.

The first İzmir Mathematics Days was hosted by Yaşar University in 2018, and the second took place at Dokuz Eylül University in 2019. Due to the COVİD-19 pandemic in 2020, the third one was organized online by the mathematics department of Dokuz Eylül University. We appreciate the efforts of all our colleagues for establishing and organizing these previous meetings.

This year, we are happy to host the fourth İzmir Mathematics Days at İzmir Institute of Technology and say welcome to all participants. As members of the mathematics community in İzmir, we are proud to say that each year the interest to these days increases, with nearly 200 participants today and speakers from Turkey, USA, Canada, Finland and Czech republic.

The mathematics days this year are again organized to be online. Each day there will be a single morning session and there will be two parallel afternoon sessions. In the morning sessions, invited speakers will give colloquium talks introducing their fields of research. The afternoon sessions are reserved for the presentations given by graduate students and young researchers. Besides, on the evening of the first and second days, there will be two more invited talks. Most of the talks will be in English. In the present booklet, you can find all abstracts and program details of the event.

Here, we would like to thank all reputable, mathematicians İzzet Coşkun, Türkü Özlüm Çelik, Burak Erdoğan, Cihan Okay, Sinem Onaran, Türker Özsarı, Jan Stovicek, Julian Weight and Joshua Zahl for accepting our invitation. We believe their talks will enrich our research scope and inspire all young mathematicians.

Also, we would like to thank all students and young researchers who will contribute by their talks and participation. We hope this event will be a good opportunity to introduce your current work and communicate it with your peers and senior mathematicians. We believe you will enjoy and learn much during these days.

Finally, we would like to express our gratitude and appreciation to the Scientific Committee and the Academic Staff of the mathematics department at İzmir Institute of Technology, who contributed to the realization of the present fourth İzmir Mathematics Days.

Yours Sincerely, Organizing Comittee

İzmir Institute of Technology, June 15-17, 2022

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Dispersive Estimates for Dirac Operators

Burak Erdoğan

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We will review recent results on dispersive decay estimates for the Dirac operators in $\mathbb{R}^n$ with a decaying self-adjoint potential. These include $L^1 \to L^\infty$ and Strichartz estimates. We also discuss the classification of threshold resonances and their effects on dispersive estimates and the limiting absorption principle for Dirac operators. The talk is based on joint works with M. Goldberg (U. Cincinnati), W. Green (RoseHulman), and E. Toprak (Yale).

Topology, Probability and Quantum

Cihan Okay

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Our experience of the physical world is essentially shaped by the act of measurement. In abstract terms a measurement can be described by a probability table consisting of a collection of measurements and the probabilities assigned to the occurrence of each outcome. When there are more than two parties, say Alice and Bob, performing measurements the resulting probability tables are dramatically different for quantum measurements, than their classical counterparts. The mathematical theory of quantum mechanics is based on Hilbert spaces and operators acting on them and Born's rule tells us how to extract probabilities as the result of a measurement. A quirky feature of quantum is observed when Alice and Bob perform measurements on entangled states. In these cases the probability tables cannot be reproduced by classical measurements. This feature, known as quantum contextuality, plays a prominent role in computational advantage in quantum computers. Topology enters the picture at this point as an intrinsic structure of the collection of measurements. In this talk I will explain how the theory of simplicial sets, combinatorial representations of topological spaces in modern homotopy theory, can be enriched into a probabilistic version that can be used to study this fundamental quantum phenomenon.

Points in the Projective Plane

İzzet Coşkun

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In this talk, I will discuss the geometry of the Hilbert scheme of n points in the projective plane, which is a smooth compactification of the configuration space of n points. I will focus on the question: What is the most special codimension one position that n points can lie in? For example, three points are typically not collinear, but in codimension one they can be collinear. This simple question will lead us to a tour of some fun mathematics ranging from moduli spaces of stable sheaves on the plane to fractal curves and palindromic numbers. This talk is based on joint work with Jack Huizenga and Matthew Woolf.

On the Finitistic Dimension Conjecture

Jan Stovicek

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Given a ring, a basic question is what the modules (also known as representations) over the ring look like. Here we restrict to the cases of (1) commutative noetherian rings (typical examples are coordinate rings of algebraic varieties or the rings of integers of number fields) and of (2) finite dimensional algebras over a field. Homological algebra provides a powerful toolbox for studying the structure of modules and it is a basic question what homological dimensions modules can attain. The Finitistic Dimension Conjecture, going back to the 1960's, says that for each ring belonging to one of the two classes mentioned above, the projective dimension of a module can only have finitely many values. Whereas in the commutative noetherian case the problem is well understood and the conjecture is false, in the situation of finite dimensional algebras the problem resists for more than half a century despite numerous efforts to solve it. In the first part of the talk, I will explain the conjecture along with some important results, while in the second part I will focus on recent contributions.

The Kakeya Conjecture: A Survey

Joshua Zahl

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The Kakeya conjecture is a problem in geometric measure theory that has connections to several deep open problems in harmonic analysis. In this talk, I will discuss the history of the Kakeya conjecture, and some of the ideas that have been used to make progress on the problem in recent years.

Endpoint Regularity of Maximal Operators in Higher Dimensions

Julian Weigt

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We prove the endpoint regularity bound

$$\|\nabla Mf\|_{L^1(\mathbb{R}^n)} \leq C_n \cdot \|\nabla f\|_{L^1(\mathbb{R}^n)}$$

for some maximal functions Mf in any dimension $n \geq 1$. This bound and various related questions have been intensively studied for all sorts of maximal operators. Nevertheless, it has essentially only been resolved on L^p for $p > 1$ and in one dimension. We prove it for the uncentered Hardy-Littlewood maximal function of characteristic functions, for general dyadic maximal functions and for the cube maximal function.
The key arguments of the proofs are of geometric nature. For example new variants of the isoperimetric inequality and of the Vitali Covering Lemma are proven and used. All proofs are mostly elementary up to applications of classical results like the relative isoperimetric inequality and the coarea formula.

Open Book Decomposition, Contact 3-Manifolds and Legendrian Knots

Sinem Onaran

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Due to Alexander, it is well known that every closed oriented 3-manifold has an open book decomposition. In the first part of the talk, I will define open book decompositions of 3-manifolds and discuss various examples in detail. Further, we I will discuss the importance of the open books in manifold theory, in particular in contact geometry. A contact structure on an odd-dimensional manifold is a maximally nonintegrable hyperplane field that vanishes nowhere. After a brief introduction to contact 3- manifolds, I will focus on a class of knots called Legendrian knots in contact 3-manifolds. A knot in a contact 3-manifold is called Legendrian if it is always tangent to the contact planes. I will discuss a new invariant for Legendrian knots which is defined using open book decompositions and discuss its applications.

Existence of Unattainable States for the Schrödinger Type Flows

Türker Özsarı

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I will first introduce the notion of controllability for differential equations in certain senses starting with the finite dimensional case. Then, I will move to distributed parameter systems (PDEs) and I will contrast the two cases. Using an integral transform method, I will give an elementary proof of the existence of physically reasonable states to which the heat flow cannot be steered. I will show that the same technique fails for dispersive equations which will motivate us to consider the latter problem with rather more technical tools. These include recent developments in well-posedness theory of initial- /boundary value problems as well as control theoretical techniques such as the Hilbert Uniqueness Method. We will perform this with the canonical example of the classical Schrödinger equation and also extend the same results to biharmonic problems.

Algebraic Curves, Computer Algebra and Integrable Systems

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An important application of algebraic curves lies in the context of integrable systems via theta functions. They give rise, for instance, to solutions of the KadomtsevPetviashvili hierarchy, a universal integrable system. This talk aims to make an excursion into this study from the lens of computational algebraic geometry. The emphasis will be on exploiting modern tools in symbolic, numerical and combinatorial algebraic geometry to investigate such solutions and their applications back to the algebraic curves.

John's Theorem and Series in Banach Spaces

Abdulbaki Aşur

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We are going to present a proof of a theorem of F. John characterizing ellipsoids of maximal volume in symmetric convex bodies in $\mathbb{R}^n$. The proof which will be presented is a relatively recent one due to F. Schuster and P.M. Gruber. We also present some basic results in Banach Space Theory which are related somehow to the geometric ideas present in John's theorem.

References

[1] F. Schuster, P.M. Gruber. An Arithmetic Proof of John's Theorem, *Archiv der Mathematik*, **85**, 82-88 (2005).

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Post Quantum PQ Calculus and Supersymmetric Units of Quantum Information

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In this talk first we introduce main ingredients of Quantum Calculus with two arbitrary bases P and Q, which is called also as Post Quantum Calculus of finite differences [1]. The calculus is related with representation of quantum groups and includes as particular cases the non-symmetric q-calculus, symmetric q-calculus, Fibonacci-Golden calculus [2], calculus of Fibonacci divisors [3] and Tamm-Dankoff quantum calculus. By introducing PQ-oscillator algebra and corresponding PQ-coherent states, we describe Fock-Bargmann representation of quantum states in terms of this calculus. In the framework of supersymmetric quantum mechanics, the generalized PQ-supersymmetric annihilation operator and corresponding eigenstates as supersymmetric PQ-coherent states are derived. These states reflect hidden PQ-Quantum supersymmetry and can be expanded in terms of orthonormal fermionic and bosonic coherent states. We show that these coherent states can represent unit of quantum information, parametrized by points on Supersymmetric Bloch Sphere, where bosonic and fermionic states correspond to the North and the South poles of the sphere, correspondingly. The Shannon entropy of our states takes maximal value for the maximally random super-qubit states on the Equator circle of Supersymmetric Bloch Sphere.
This work was supported by BAP project 2022 IYTE-1-0002.

Keywords. q-calculus, supersymmetry, super-qubit, coherent states.

References

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The Initial-Boundary Value Problem for Higher Order Schrödinger Equation on The Half-Line

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The initial-boundary problem for higher order Schrödinger equation on the right half-line is considered with a source f, an initial value u_0 and an inhomogeneous Dirichlet datum g in L^2-based fractional Sobolev spaces:

$$\begin{aligned} &iu_t + i\beta u_{xxx} + \alpha u_{xx} + i\delta u_x = f, \quad (x,t) \in \mathbb{R}_+ \times (0,T), \\ &u(x,0) = u_0(x), \quad x \in \mathbb{R}_+, \\ &u(0,t) = g(t), \quad t \in (0,T), \end{aligned} \tag{1}$$

where $\alpha, \delta \in \mathbb{R}$ and $T, \beta > 0$. We analyze the regularity of the solution $u(x,t)$ of the linear ibvp (1) by using a decompose-reunify argument. We first decompose the linear ibvp into the pure homogeneous ibvp with zero initial datum, the homogeneous ivp and the nonhomogeneous ivp with zero initial datum to observe separately the effect of each data f, u_0 and g on the regularity. After estimating the solutions of the decomposed problems with respect to their own inhomogeneous data, respectively, we reunify them stating the relation between the data (f, u_0, g) for the linear ibvp (1) and the corresponding data for the decomposed problems. We also obtain a representation formula for the pure homogeneous ibvp with zero initial datum by using the unified transform method, which is also known as Fokas' method [1]. Consequently, this formulation is used to obtain space and time estimates for the corresponding model.
This study is a part of our local and global well-posedness analysis for higher order nonlinear Schrödinger equation.

Keywords. Fokas' method. Space-time estimates. Local wellposedness. Global well-posedness. Regularity.

References

[1] A. S. Fokas, A unified approach to boundary value problems, *Vol 78 of CBMS-NSF Regional Conference Series in Applied Mathematics, Society for Industrial and Applied Mathematics (SIAM), Philadelphia, PA* (2008).

Exactly Solvable Generalized Burgers Models with Variable Coefficients

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In this work, we study an initial value problem (IVP) for a one dimensional generalized Burgers equation (BE) with variable coefficients, $U_t + (\dot{\mu}(t)/\mu(t))U + UU_x = (1/2\mu(t))U_{xx} - a(t)U_x + b(t)(xU)_x - \omega^2(t)x + f(t)$, defined for $x \in \mathbb{R}$, $t > 0$, [1],[2]. First, by using Cole-Hopf transformation, we linearize the generalized BE to the diffusion-convection-reaction equation and then applying Wei-Norman Lie algebraic procedure [1], we find the evolution operator of the corresponding linear diffusion-type equation exactly in terms of solutions to the second order inhomogeneous characteristic ODE determined by the time-dependent parameters of the generalized BE. Then, we formulate the general closed form solution of the IVP for generalized BE in terms of this characteristic equation and solutions of IVP for standard BE. Later, using the translation and Galilean symmetries of the standard BE, we construct families of Burgers solutions whose wave profiles propagate according to the general solution of the characteristic equation. Also we discuss some particular solutions such as generalized shocks, triangular and N-shaped generalized traveling waves and rational type solutions with pole type moving singularities and introduce concrete exactly solvable models, [4].

Keywords. Generalized Burgers equation, variable coefficients, initial value problem, evolution operator method, exact solutions.

Reference

[1] J.M. Burgers, A Mathematical Model Illustrating the Theory of Turbulence. *Adv. Appl. Mech.*, **1**,171, (1948).

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Nonexistence of Solutions for the Variable Coefficients Wave Equation with Strong Damping

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In this work, we consider the variable coefficients wave equation with strong damping. Under suitable conditions on variable coeffcients, we prove the blow up of solutions.

Keywords. Nonexistence, Wave equation, Variable coefficients.

References

[1] V. Georgiev, G. Todorova. Existence of a solution of the wave equation with nonlinear damping and source terms, *Journal of Differential Equations* **109**(2)(1994) 295-308.

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Some Geometric Properties of Orlicz Spaces Equipped with s-norms

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Let (X, Σ, μ) σ-finite, non-atomic and complete measurable space and Φ be an Orlicz function. In Orlicz space L^{Φ}, the first aim is to give a relation the other norms with s-norm family on Orlicz spaces. The second aim is to examine some geometric properties in Orlicz spaces with respect to s- norms, which are studied with respect to Luxemburg, Orlicz and Amemiya norms. In this study, some geometric properties of Orlicz space are given in simpler terms.

Keywords. Orlicz Space, Extreme Points, Compact Operators.

References

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Relationship of Fixed Point Theory with Gradient Descent Methods

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It is well known that gradient descent methods can be realized by using some well known fixed point iterations. In fact, the main purpose of gradient descent methods is to minimize the objective functions associated with a concerned problem by using these iterations. Especially, optimization techniques based on gradient methods are of the utmost importance in minimizing error functions used to train a machine(or deep) learning algorithm. In particular, when the size of data is sufficiently large, gradient descent methods requires to be accelerated [1]. To manage this acceleration task, many works were brought to the literature using fixed point iterations [1],[2]. In this presentation, we first mention about gradient descent methods and their accelerations.

Keywords. convex optimization, fixed point theory, big data, machine learning, contraction mapping, gradient descent, heavy balls.

References

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Dedekind Harmonic Numbers

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We introduce a generalization of the harmonic numbers, motivated by the Dedekind zeta function of a number field. For any number field K, we define $h_K(n)$, the Dedekind harmonic number, as the sum of reciprocals of the norm of integral ideals with norm less than n. We will show that for any number field, the corresponding Dedekind harmonic numbers are non-integer except for finitely many of them, together with density results.

Keywords. harmonic numbers, prime number theory, Dedekind zeta function, number fields.

References

[1] Ç. Altuntaş, H. Göral, (2021). Dedekind harmonic numbers. *Proc. Math. Sci.* 131(46).

Qualitative Properties of Solutions of Some Keller - Segel Type Systems

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Mathematical modeling of biological phenomena has become important to better understand the associated process. One of the these biological events is chemotaxis. Keller - Segel type system first presented in 1970 is a classical chemotaxis modeling [1]. This model includes a system of partial differential equations. I will introduce some Keller - Segel type systems and talk about qualitative properties of their solutions.

Keywords. . Chemotaxis, local existence, global existence, boundedness, blow-up, Keller - Segel model

References

[1] E. F. Keller and L. A. Segel . Initiation of slime mold aggregation viewed as an instability, *Journal of Theoretical Biology* **26**(3) (1970).

Stability Analysis and Control of the Kuramoto Model Driven with Alpha Stable Processes

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Finite variance Gaussian processes are insufficient in modelling the noise with irregular and impulsive behavior in the power grids modeled with Kuromota Model with alpha-stable process. For this reason, using the alpha-stable process (alpha(α)-stable Levy process), which have infinite variance and heavy tailed distributions will be more appropriate model for the noise in the system. Although alpha stable processes better model the noise in the system, it is very difficult to analyze the stability of the system using the Lyapunov theory. In this study, we indicate how we can take advantage of the Lyapunov theory by making use of the integral representation with respect to a Poisson random measure of alpha stable processes. Thus, we obtain a controller for the stochastic Kuramoto model driven alpha stable processes and determine the conditions for the parameters in the model to provide the stochastic stability in the asymptotic sense.

Keywords. Non-Gaussian processes; Non-linear processes; Stochastic control; Power Systems

Smoothing and Global Attractors for the Hirota-Satsuma System on the Torus

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In this talk, we consider the Hirota-Satsuma system, a coupled Korteweg de Vries system (CKdV), with periodic boundary conditions. The model explains two long waves' interactions with separate dispersion relations. CKdV systems have a wide range implementations in different fields of chemistry, biology, hydrodynamics, mechanics, plasma physics, etc. The talk concerns with the dynamics of solutions to the Hirota-Satsuma system. In particular, given initial data in a Sobolev space, the difference of the nonlinear and linear evolutions lies in a smoother space. The smoothing gain we obtain depends very much on the arithmetic nature of the coupling parameter of the system. To cope with the resonances stemming from interactions of various frequencies, dependent on the coupling parameter, we invoke the Diophantine approximation of real numbers. Moreover, we address the forced and damped version of the Hirota-Satsuma system, once having the analogous smoothing estimates, we discuss the existence and smoothness of a global attractor in the energy space.

Trisections of Smooth 4-Manifolds

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Trisections of 4-manifolds were first introduced by David Gay and Robion Kirby [1] and have blossomed into a popular field of study ever since. As trisections are in close relation with Heegaard splittings of 3-manifolds, they carry three-dimensional techniques into the strange realm of dimension four.
In our talk, we will state some well-known results and open problems from the trisections literature after introducing essential parts of the trisections theory including stabilizations, trisection diagrams, and the relation with handle decompositions. When a 4-manifold has connected boundary, we will see that a trisection yields an extra structure [1, 3]. Toward the end of the talk, we will give algorithms for passing between Kirby diagrams and trisection diagrams [2, 3], and describe a new relative trisection diagram for a Mazur Manifold.

Keywords. 4-manifold, Heegaard splitting, trisection, Mazur manifold.

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A Formula for Volume forms on Representation Varieties of Surfaces with Boundary $\Sigma_{g,2}$

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Let $\Sigma_{g,n}$ be a compact oriented connected surface of genus $g = 2k \geq 4$ with boundary disjoint union of n circles. Let G be the complex reductive group $SL_2(\mathbb{C})$. We restrict our attention to irreducible representations whose stabilizers coincide with the center of G. In [1], such representations are called *good representations*. For surfaces $\Sigma_{g,n}$, we denote the set of conjugacy classes of good representations from the fundamental group of $\Sigma_{g,n}$ to G by $\mathcal{R}^g(\pi_1(\Sigma_{g,n}), G)$. The relative set of conjugacy classes of representations is given by $\mathcal{R}(\pi_1(\Sigma_{g,n}), \partial(\Sigma_{g,n}), G)_{\rho_0}$ and we denote the corresponding open subset of good representations by $\mathcal{R}^g(\pi_1(\Sigma_{g,n}), \partial(\Sigma_{g,n}), G)_{\rho_0}$ for a representation $\rho_0 : \pi_1(\Sigma_{g,n}) \to G$. The twisted Reidemeister torsion of $\Sigma_{g,n}$ can be seen as a holomorphic volume form $\Omega_{\Sigma_{g,n}}$ on $\mathcal{R}^g(\pi_1(\Sigma_{g,n}), G)$ and the holomorphic symplectic form $\omega_{\Sigma_{g,n}}$ is defined on relative representation variety $\mathcal{R}^g(\pi_1(\Sigma_{g,n}), \partial(\Sigma_{g,n}), G)_{\rho_0}$. In order to obtain a holomorphic symplectic volume form on $\mathcal{R}(\partial(\Sigma_{g,n}), G)$, Heusener and Porti identified the representation variety of the circle $\mathbb{S}^1$ with G, by mapping each representation to the image of a fixed generator of $\pi_1(\mathbb{S}^1)$. They restricted to representations which map the generators of $\pi_1(\mathbb{S}^1)$ to regular elements and established a relation between the volume forms $\Omega_{\Sigma_{g,n}}$ and $\omega_{\Sigma_{g,n}}$ [2]. By using this relation with certain conditions, we show that the holomorphic volume form on the representation variety of the surface $\Sigma_{g,2}$ can be expressed as a product of the symplectic holomorphic volume forms on the representation variety of $\Sigma_{2,2}$. Precisely,

$$\left|\Omega_{\Sigma_{g,2}}(\wedge \mathbf{h}^1_{\Sigma_{g,2}})\right| \;=\; \mathcal{M}_k \prod_{i=1}^{k} \left|\omega^5_{\Sigma^i_{2,2}}(\wedge \mathbf{h}^1_{\Sigma^i_{2,2}}) \wedge \nu_1^* \wedge \nu_2^*\right|.$$

Here, $\mathcal{M}_k = (5!)^{-k} \, \frac{\nu(\wedge \mathbf{h}^1_{\mathbb{S}1})^{-2k+2}}{<\wedge \mathbf{h}^1_{\mathbb{S}1}, \wedge \mathbf{h}^0_{\mathbb{S}1}>^{-2k+2}} \in \mathbb{C}$.

Keywords. Twisted Reidemeister torsion, volume form, representation variety.

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A Full Description of Compact Extremal Operators on Orlicz Spaces Equipped with s-norms

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Let Ω be a compact Hausdorff space, E be the predual of the Orlicz space L^{Φ} and T be a compact operator from E to $C(\Omega)$. The map $T^{'} : \Omega \longrightarrow L^{\Phi}$ is defined by $(T^{'}\omega)(x) = (Tx)(\omega)$ for $\omega \in \Omega, x \in E$. Then T is called as nice if $T^{'}(\Omega) \subseteq \operatorname{Ext} B(L^{\Phi})$ where $\operatorname{Ext} B(L^{\Phi})$ is the set of extreme points of closed unit ball in L^{Φ}. It is known that nice operators are extremal [2]. For the converse, under some topological properties of the set $\operatorname{Ext} B(L^{\Phi})$, we have that all compact extremal operators consist of nice operators. In this study, some of these properties for the set of extreme points in Orlicz spaces were investigated with respect to s-norms.

Keywords. Orlicz Spaces, Extreme Points, Compact Operators

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Uniqe Decomposition into Regular Ideals for Marot Rings

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Let R be a commutative ring with unity. In the papers [1], [2], and [3], the authors define the UDI property as: R has the unique decomposition into ideals (UDI) property if, for any R-module which decomposes into a finite direct sum of ideals, this decomposition is unique up to the order and isomorphism class of the ideals. They gave a characterization of a Noetherian domain/ring to satisfy UDI property.

We define the UDI-like property called UDRI property in the following way: R has the unique decomposition into regular ideals (UDRI) property if, for any R-module which decomposes into a finite direct sum of regular ideals, this decomposition is unique up to the order and isomorphism class of the regular ideals [4].

In this talk, we will present some preliminary results for Marot rings (every regular ideal of R is generated by its regular elements) whose regular ideals are finitely generated and give a necessary and sufficient condition for these rings to satisfy the UDRI property.

Keywords. Marot rings, valuation rings, h-local rings, regular localization

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Rational Groups whose Character Degree Graphs are Disconnected

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Throughout this talk, G is a finite group and $\mathrm{Irr}(G)$ is the set of all irreducible complex characters of G. The set of all irreducible complex character degrees of G is denoted by $\mathrm{cd}(G)$ so that $\mathrm{cd}(G) = \{\chi(1) : \chi \in \mathrm{Irr}(G)\}$. Let $\rho(G)$ be the set of all primes that divide some irreducible character degrees in $\mathrm{cd}(G)$. The character degree graph of G, denoted by $\triangle(G)$, is the graph whose vertex set is $\rho(G)$. Two distinct vertices p, q in $\rho(G)$ are connected by an edge iff there exists at least one degree $a \in \mathrm{cd}(G)$ such that pq divides a. Manz, Willems and Wolf proved in [2] that the character degree graph $\triangle(G)$ of a finite group G has at most three connected components and if G is solvable, then $\triangle(G)$ has at most two connected components. Palfy showed in [3] that each connected component of the character degree graph of a solvable group must be a complete graph. In [4], Lewis classified all solvable groups having disconnected character degree graphs. Later, Lewis and White classified in [5] nonsolvable groups whose character degree graphs are disconnected. A finite group all of whose complex character values are rational is called a rational group. Motivated by these results, in [1], we classify all rational groups whose character degree graphs are disconnected.

Keywords. Rational Groups, Character degree graphs.

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Mathematical Modeling of Infectious Diseases

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In this work, we firstly give some basic definitions used in the mathematical models and about the epidemiology of infectious diseases. By making assumptions, we set a model which is called SIR epidemic model, and its mathematical properties is discussed. SIS epidemic model which is a variant of Logistic model is also given. Finally, it is included demography to SIR model, and stability of equilibria of the SIR epidemic model with demography is investigated. This work is based on the book " An introduction to mathematical epidemiology " written by Maia Martcheva. [1]

Keywords. Epidemiology, mathematical models.

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Bazzoni's Conjecture and Almost Prüfer Domains

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Bazzoni's conjecture states that if every nonzero locally principal ideal of a Prüfer domain D is invertible, then D is of finite character. This conjecture was proved in [2]. In this talk, we will focus on Bazzoni's conjecture for almost Prüfer domains which states that if every locally finitely generated ideal of an almost Prüfer domain D is finitely generated, then D is of finite character. This result is proved in a more general setting of almost Prüfer v-multiplication domains.

Keywords. Almost Prüfer domain, LPI domain, finite character.

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Mathematical Behavior of Solutions for a Delayed Hyperbolic-Type Equations

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Controlling the behavior of solutions for partial differential equations with time delay effects has become an active research area. Generally, delay effects occur in many applications and practical problems such as physical, chemical, biological, thermal and economics. In many cases, delay is a source of instability, even an arbitrarily small delay may destabilize a system which is uniformly asymptotically stable in the absence of delay unless additional conditions or control terms have been used. In this work, we study a delayed hyperbolic-type equation. Under appropriate conditions, we prove the mathematical behavior of solutions like existence, blow up, decay.. etc.

Keywords. Delay, Hyperbolic-type equation, Mathematical behavior of solutions.

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On 1-Absorbing Intuitionistic Fuzzy Ideals of Commutative Semirings

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The goal of this research is to look at the algebraic structure of 1-absorbing ideals and how they may be applied to fuzzy sets, as well as the linkages and algebraic features that exist between them. The 1-absorbing intuitionistic fuzzy ideal is examined in this study as an addition to the literature. In this research, intuitionistic fuzzy 1-absorbing ideals are defined, and 1-absorbing ideals and intuitionistic fuzzy sets are used to illustrate instances and theorems.

Keywords. Fuzzy sets, fuzzy ideals, 1-absorbing ideals, 1-absorbing fuzzy ideals, 1-absorbing intuitionistic fuzzy ideals.

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Existence and Stabilization of Solutions of a Linear Viscoelastic Wave Equation with Neumann Boundary Condition

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We investigate the linear viscoelastic wave equation on a bounded domain $\Omega \subset \mathbb{R}^n$ subject to an inhomogeneous Neumann manipulation activated on a component of the boundary. First, we establish global existence results by seperating problem into the two parts. In the first part, we consider usual wave equation with the given initial and boundary data using dynamic extension method. In the second part, we consider viscoelastic part of the equation which also depends on the solution of the first part. We construct approximate solutions by using Faedo-Galerkin method and then use a priori estimates to prove the existence of the weak solutions. Afterwards, we prove uniform stabilization with decay rate determined by behavior of Neumann boundary data and the relaxation function.

Keywords. Viscoelastic wave equations, Relaxation function, Inhomogeneous Neumann boundary data, Faedo-Galerkin method, Approximate solutions, Existence, Stabilization.

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Stabilization of Higher-Order Schrödinger Equation Using Right Endpoint Controllers

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Standard backstepping method fails for stabilizing third order evolutionary equations posed on a finite interval, where a single homogeneous boundary condition imposed at one end and control input(s) acting from the other hand. This issue was first addressed in Korteweg de-Vries equation [1] as an open problem. Later it was treated in the case of uncritical domains [2] and in the case of critical domains [3]. The same issue also exists for higher-order Schrödinger equation.

In this talk, we design a feedback controller by modifying the backstepping strategy in such a way that, corresponding closed-loop system is exponentially stable with respect to L^2-norm both for the case of critical and uncritical lengths of intervals. From the wellposedness point of view, this process requires to prove some regularity estimates for an associated initial–boundary value problem with inhomogeneous boundary data. At the end of the talk, we present a numerical simulation verifying our theoretical result.

Keywords. Higher-order Schrödinger equation, backstepping, boundary controller, observer, stabilization.

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3 Noktalı Yol Grafın Karışık Genişlemelerinin Spektral Karakterizasyonu

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Bir G grafının karışık genişlemesi, G nin herbir noktasının ya bir klik ya da bir ko-klik ile yerdeğiştirilmesiyle elde edilen H grafıdır, öyle ki H grafında bulunan bu klik ve ko-kliklerdeki noktalar G deki herhangi iki nokta arasındaki komşuluk ilişkisini devam ettirir. Özel olarak G grafı üç noktalı yol graf seçildiğinde, H ın 0 ve -1 e eşit olmayan en fazla üç özdeğeri olur. Bu durum, H grafının karakterize edilebilmesine imkan sağlayan en temel özelliğini oluşturur [1, 2, 3].

Anahtar Kelimeler. Graf matrisleri, graf spektrumu, karışık genişleme

Kaynakça

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Metrik Uzaylar Üzerinde Bazı Sabit Çember Teoremleri ve Örnekleri

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Sabit noktaların varlığı ve özellikleri ile ilgili teoremler sabit nokta teoremi olarak çalışılmaktadır. Son zamanlarda, sabit nokta kümesine geometrik bir yaklaşım ile sabit çember problemi sabit nokta teorisinin bir genellemesi olarak bırakılmıştır. Biz de bu konuşmada, iki farklı yardımcı fonksiyon yardımıyla sabit çember problemine varlık teoremleri elde ettik. Bu amaç içinde Caristi tipindeki daralma koşulundan yararlanarak, literatürde var olan bazı sonuçları genelledik. Elde ettiğimiz sonuçları gerçekleyen çeşitli örnekler verdik. Ayrıca, sabit çemberlerin tekliği için Khan ve Brianciari tipinde daralma koşulları ile teklik teoremleri elde ettik.

Keywords. Sabit nokta, sabit çember, varlık teoremi, teklik teoremi.

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İşaretli Grafların Spektral Özellikleri

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Basit bir G grafının her bir kenarının +1 ya da -1 ile işaretlenmesiyle elde edilen H grafına işaretli graf denir, bu tanım ilk olarak [4] te Zaslavsky tarafından verilmiştir. Son zamanlarda, işaretli grafların spektrumları, graf spektrası çalışan araştırmacılar tarafından çok fazla ilgi görmektedir[1, 2, 3]. Bu durumun temel motivasyonu, işaretli grafların spektral teorisinin, işaretsiz grafların spektral teorisinin zarif bir şekilde genelleştirilmesi biçiminde olmasıdır. Öte yandan, işaretsiz graflar, asıl olarak dengeli işaretli grafların özel bir durumunu teşkil etmektedir.

Anahtar Kelimeler. Graf matrisleri, graf spektrumu, işaretli graf

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Sıra Norm Sürekli Operatörlerin Latis Yapısı Üzerine

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Kazem Hanghnejad Azar, Ali Rıza Jalili ve Mohammad Farsbaf Moghili isimli yazarlar Positivity dergisinde 2021 yılında 'order-to-topology continuous operators' isimli makalelerinde sıra-topolojik-sürekli operaratöri tanıtmışlardır. Yazarlar bu çalışmasında E bir Riesz uzayı ve F bir normlu Riesz uzayı olmak üzere E den F ye tanımlı her sıra norm sürekli operatörünün modülünün olup olmadığını açık problem olarak bırakmışlardır. Biz bu çalışmada bu problemin genelde doğru olmadığını gösteren bir örnek inşa edeceğiz ayrıca yukardaki açık probleme bazı özel şartlar yükleyerek T nin modülünün var ve sıra norm sürekli olduğu sonucu verilecektir.

Roth's Theorem on Arithmetic Progressions

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An *arithmetic progression of length k* (k-AP) is a sequence of k-numbers such that each difference between two consecutive terms is the same constant. Finding long arithmetic progressions in certain subsets of integers is at the center of mathematics in the last century. In this talk, we will first give a quick survey of remarkable results on this topic. In particular, we will focus on Roth's theorem on arithmetic progressions. Finally, we will also talk about recent significant results.

Keywords. Arithmetic progression, Roth's theorem.

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New Infinite Rank Summands of Homology Cobordism Group

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Since the 1980s, the homology cobordism group $\Theta^3_{\mathbb{Z}}$ has been a central object in low-dimensional topology. Although its algebraic structure is still mysterious, the recent achievement of Dai, Hom, Stoffregen, and Truong indicates that it is very complicated. They prove that $\Theta^3_{\mathbb{Z}}$ has an infinite rank summand $\mathbb{Z}^\infty$ generated by the Brieskorn homology spheres $\{X_n = \Sigma(2n+1, 4n+1, 4n+3)\}_{n=1}^\infty$, see [1].

We generalize this link of singularity by assuming that $pq + pr - qr = 1$ where p, q and r are pairwise coprime ordered positive integers. Clearly, the parameters of the family $\{X_n\}_{n=1}^\infty$ satisfy the latter identity. Then Brieskorn homology spheres $\Sigma(p, q, r)$ can be realized as the boundaries of *almost simple linear graphs*.

We compute Ozsváth-Szabó d-invariants and connected Heegaard-Floer homologies of two families of Brieskorn homology spheres $\{Y_n = \Sigma(2n+1, 3n+2, 6n+1)\}_{n=1}^\infty$ and $\{Z_n = \Sigma(2n+1, 3n+1, 6n+5)\}_{n=1}^\infty$, respectively see [2] and [3]. They are also two specific boundaries of almost simple linear graphs. Using Floer theoretic invariants of Dai, Hom, Stoffregen, and Truong, we show that $\{Y_n\}_{n=1}^\infty$ and $\{Z_n\}_{n=1}^\infty$ also generate infinite rank summands in the homology cobordism group. We will also compare their homology cobordism classes and see that they are not cobordant to each other.

In this talk, our aim is to present the framework of our effective computation procedure and discuss its combinatorial nature. This is joint work with Çağrı Karakurt.

Keywords. Brieskorn spheres, homology cobordism group, Heegaard Floer homology.

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Truncation on ℓ-groups

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In this study, we give the definition of truncation and its properties on ℓ-groups with truncation. Here, the ℓ-group means a divisible abelian lattice-ordered group. Finally, we indicate several operations on the truncated ℓ-groups.

Keywords. truncation, ℓ-group, lattice ordered group

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Metrik Uzaylarda Sabit Çemberler

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Sabit nokta teorisi Stefan Banach zamanından beri bilimin pek çok dalında hem teorik hem de uygulama anlamında kullanılmaktadır. Bu konuşmada, sabit nokta teorisine geometrik bir yaklaşım olarak, metrik uzaylar üzerinde bazı dönüşümlerin sabit çemberler için varlık ve teklik teoremleri vereceğiz. Farklı metrik fonksiyonları kullanarak bir çemberin eleman sayısının değişebileceğini vurgulayıp, alışılmış metrik uzay üzerinde de teoremleri sağlayan örnekler vereceğiz.

Keywords. Sabit nokta, sabit çember, varlık teoremi, teklik teoremi.

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ωe^*-Ayırma Aksiyomları

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Topolojiler inceldikçe farklı nokta ve farklı kümeleri, farklı komşuluklarla ayırma imkanı doğar. Bu noktada önemli olan ise araştırmacıların küme üzerinde yapmak istediği işe uygun bir topolojik yapı kurmasıdır. Bu sebeple topolojik yapıları bazı ortak özellikleri olan sınıflara ayırmak daha yararlı olmaktadır. Bu noktada ayırma aksiyomlarının önemli bir rolü vardır.

Son yıllarda ayırma aksiyomlarının bazı özel ve genel formları, birçok araştırmacı tarafından tanımlanmış ve çalışılmıştır. Ayrıca açık kümelerin özel ve genel bazı formları, bu çalışmalara ayrı bir önem kazandırmıştır. 1983 yılında M.E. Abd El-Monsef, S.N. El-Deeb ve R.A. Mahmoud tarafından verilen β-açık küme [3] ve 2003 yılında K.Y. Al-Zoubi ve B. Al-Nashef tarafından verilen ω-açık küme [2] kavramlarından yola çıkarak H.H. Aljarrah, M.S.M. Noorani ve T. Noiri tarafından tanımlanan $\omega\beta$-açık kümeler [1] ile 2015 yılında H.H. Aljarrah, M.S.M. Noorani ve T. Noiri tarafından tanımlanan $\omega\beta$-ayırma aksiyomları [5] bunun önemli örneklerinden biri olarak karşımıza çıkmaktadır.

Bu çalışmada ise $\omega\beta$-açık küme kavramından daha genel bir kavram olan ωe^*-açık küme [4] kavramından hareketle $\omega\beta$-ayırma aksiyomlarından daha zayıf bir kavram olarak karşımıza çıkan ωe^*-ayırma aksiyomları çalışılmıştır. ωe^*-T_0 uzay, ωe^*-$T_{\frac{1}{2}}$ uzay, ωe^*-T_1 uzay ve ωe^*-T_2 uzay kavramları tanıtılmış ve bu kavramların bazı karakterizasyonları elde edilmiştir. Ayrıca ωe^*-R_0 uzay ve ωe^*-R_1 uzay kavramları tanılanarak aralarındaki bazı ilişkiler incelenmiştir.

Anahtar Kelimeler. ωe^*-açık küme, ωe^*-T_1 uzay, ωe^*-$T_{\frac{1}{2}}$ uzay, ωe^*-T_1 uzay, ωe^*-T_2 uzay, ωe^*-R_0 uzay, ωe^*-R_1 uzay

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On 2-Absorbing Vague Fuzzy Ideals of Commutative Semirings

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The purpose of this study is to investigate the algebraic structure of 2-absorbing ideals, as well as how they may be applied to fuzzy sets and the connections and algebraic properties that exist between them. This study adds to the literature by looking at the 2-absorbing vague fuzzy ideal. In this study, 2-absorbing vague fuzzy ideals are established, and cases and theorems are shown using 2-absorbing ideals and vague fuzzy sets.

Keywords. Fuzzy sets, fuzzy ideals, 2-absorbing ideals, 2-absorbing fuzzy ideals, 2-absorbing vague fuzzy ideals.

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Dirichlet Boundary Value Problem for the Laplace Equation in the Semi-Infinite Domain via a Boundary Integral Equation Method

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We propose a method to solve the boundary value problem for the Laplace equation in a doubly connected semi-infinite domain. With the aid of a conformal map the semi-infinite domain is transformed to a doubly connected bounded domain. Then the problem is reduced to a system of linear boundary integral equations by representing the solution to the boundary value problem as a combination of double- and single-layer potentials with a modification that ensures the unique solvability of the system of Fredholm integral equations of the second kind. The system is solved numerically via the Nyström method[1].

Keywords. Boundary value problem, laplace equation, boundary integral equations, nyström method, conformal mapping

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A Generalization of Injective Modules

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Harada [4] introduced the notions of mininjective modules and rings as follows: Let M and N be right R-modules. M is said to be *min-N-injective* if for every simple submodule K of N, and every homomorphism $f : K \to M$, there exists a homomorphism $h : N \to M$ such that $h|_K = f$. If we take the right R-module R_R for N, then M is called *mininjective*. On the other hand, according to Harada [5], M is said to be *simple-N-injective* if for every submodule K of N, and every homomorphism $f : K \to M$ with $f(K)$ simple extends to N. If $N = R_R$, M is called simple-injective. The concepts of mininjectivity and simple-injectivity of rings and modules aroused interest and many results on them and their generalizations have been appeared in the litarature, see for example [2, 3, 6, 7]. In this talk, we aim to present some new results about the aforementioned modules that are recently appeared in [1].

Keywords. Quasi-Frobenius rings, injective, mininjective, simple-injective.

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Classification of Orlicz Spaces equipped with s-norms

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Orlicz Spaces equipped with s norms introduced by M. Wisla. L_s^{Φ} is Orlicz spaces equipped with s-norms. In this study, our aim is to classify s norms with respect to σ_s numbers which is defined by $\sigma_s := \sup\{u \geqslant 0 : s(u) = 1\}$. This classification helps us for investigate the s norms more easily.

Keywords. Orlicz space, Extreme points, Compact operators

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Spin Structures on Real Bott Manifolds

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A real Bott tower of height n is a sequence of real projective bundles

$$B_n \longrightarrow B_{n-1} \longrightarrow \cdots \longrightarrow B_1 \longrightarrow \{point\} \tag{2}$$

such that for each $j \in \{1, 2, ..., n\}$, $B_j \to B_{j-1}$ is the projectivization of the Whitney sum of a real line bundle L_j and the trivial line bundle over B_{j-1}[1]. The manifold B_n is called a real Bott manifold.
In this talk, we first give necessary and sufficient conditions for the existence of a Spin structure on real Bott manifolds. This result is due to [2]. Then we discuss some results on the number of real Bott manifolds with Spin structures for particular n's that we obtained using SageMath.

Keywords. Acyclic Digraphs, Real Bott Manifold

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Asymptotic Behavior of Solutions for p-biharmonic Parabolic Equation with Logarithmic Nonlinearity

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It is possible that many of the problems we encounter in daily life can be modeled with ordinary or partial differential equations. These problems can be related to many fields from physics to chemistry, from biology to medical science. However, it is often not possible to find an exact solution to every modeled problem. In order to find an approximate solution for these problems or at least to have an idea about the behavior of the solution, it has become necessary to limit the equation to some conditions. For this reason, it is aimed to find well-defined solutions by adding initial and boundary conditions to the problems. In order to find a well-defined solution, the first step is to investigate the existence of the solution, the uniqueness of the solution, if any, and its dependence on the initial data. The existence of the solution and the asymptotic behavior of the equation that has proven to be unique, that is, the behavior of the solution in a finite or infinite time, it allows us to have an idea even if the solution is not known exactly. This paper investigate the p-biharmonic parabolic equation with logarithmic nonlinearity in a bounded domain. Firstly, we consider the global existence of solutions. Later, we investigate the decay of solutions.

Keywords. p-biharmonic parabolic equation, Asymptotic behavior, Logarithmic nonlinearity.

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On the Depth and Reflexivity of Modules

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In 1994, Huneke and Wiegand introduced the Depth Formula, but in 2007, they announced in an erratum that one of the conclusions in the depth formula theorem is flawed due to an incorrect convention for the depth of the zero module. Not until 2019 was the claim proven to be false by Celikbas and Takahashi. In this talk, we determine new conditions under which the depth formula theorem holds true, i.e., if the tensor products of finitely generated modules over hypersurface rings is reflexive, then both of their factors are reflexive. Finally, we will discuss some examples to show why these results are new and necessary.

Categorical Methods in the Representation Theory of Artin Algebras

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In this talk we will introduce the basics of the representation theory of Artin Algebras. In particular, the notion of right minimal morphisms will help us to prove the existence of a projective cover for any finitely generated module. We will also characterize the indecomposable projective modules over these algebras.

Keywords. Artin algebras, representation theory

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Applications of Cayley Digraphs to Waring's Problem and Sum-Product Formulas

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In this talk, we first present some elementary new proofs (using Cayley digraphs and spectral graph theory) for Waring's problem over finite fields, and explain how in the process of re-proving these results, we obtain an original result that provides an analogue of Sárközy's theorem in the finite field setting (showing that any subset E of a finite field $\mathbb{F}_q$ for which $|E| > \frac{qk}{\sqrt{q-1}}$ must contain at least two distinct elements whose difference is a k^{th} power). Once we have our results for finite fields, we can apply some classical mathematics to extend our Waring's problem results to the context of general (not necessarily commutative) finite rings. In the second half of our talk, we talk about some sum-product formulas related to matrix rings over finite fields, which can again be proven using Cayley digraphs and spectral graph theory in an efficient way.

Keywords. Waring's problem, Cayley digraphs, finite fields.

Döngüsel Çizgelerin Ricci Eğrilikleri

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Lin, Lu ve Yau tarafından tanıtılan (kaba) Ricci eğriliği, lokal olarak sonlu çizgeler üzerinde bir izomorfizm invaryantı sunmaktadır. Bu nedenle, çizge ailelerinin Ricci eğriliklerine ait bir katalog oluşturmak önemlidir. Eğriliklerin hesaplanmasında kullanılan önemli araçlardan biri Eşleşme Koşuludur. Bu çalışmanın amacı, eşleşme koşulunu kullanarak Ricci eğriliği sabit olan döngüsel çizge aileleri oluşturmaktır. Burada kullanılan yöntem, Cayley çizgeleri için de kullanılabilmektedir.

Keywords. Çizge, döngüsel çizge, Ricci eğriliği, eşleşme koşulu.

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Time-Evolution of Cauchy-Euler Type Quantum Oscillator in the Presence of Variable Magnetic and Electric Fields

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We introduce an exactly solvable Cauchy-Euler type quantum parametric oscillator in the presence of time-variable external fields. The corresponding evolution problem is solved by using Wei-Norman Lie algebraic approach [1], [3]. Then, time-evolution of the eigenstates and coherent states [2], is found explicitly in terms of solutions to the corresponding system of coupled classical equations of motion. Also, squeezing properties of the wave packets [4], and their trajectories in the two-dimensional configuration space are discussed according to the influence of the time-variable parameters and external fields.

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İki Değişkenli q-Bleimann, Butzer ve Hahn Operatörlerinin Yaklaşım Oranları

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Bu çalışmada Lineer pozitif operatör tanımından başlanarak süreklilik modülü, Lipschitz sınıfı fonksiyonlar ve operatör dizileri için düzgün yakınsaklık kavramı ve bununla birlikte Korovkin Teoremi ele alınmıştır. $C_B[0,\infty)$ uzayının bir alt uzayı olan H_w uzayı tanımlanmış ve Bleimann, Butzer ve Hahn operatör dizisinin H_w uzayındaki fonksiyonlar için $[0,\infty)$ aralığında düzgün yakınsaklığı incelenmiştir. Daha sonra bu operatörün n ye göre monotonluğu bölünmüş farklar yardımıyla verilmiştir. q tamsayısına dayalı Bleimann, Butzer ve Hahn operatörlerinin tanımı [1] verilip bu operatör dizisinin düzgün yakınsaklığı incelenmiştir. Ayrıca bu operatör dizisinin yaklaşım hızı süreklilik modülü ve Lipschitz tipli maksimal fonksiyonlar yardımıyla değerlendirilmiştir. Ardından q tamsayısına dayalı Bleimann, Butzer ve Hahn operatörlerinin iki değişkenli hali tanımı [2] verilerek bu operatörlerin reel uzayın sınırlı ve sürekli bir alt uzayında sürekli bir fonksiyona düzgün yakınsadığı gösterilmiştir. Ayrıca bu operatör dizisinin yaklaşım hızı süreklilik modülü ve Lipschitz tipli maksimal fonksiyonlar yardımıyla değerlendirilmiştir. Daha sonra özgün olarak q - Bleimann, Butzer ve Hahn operatörlerinin Voronovskaya tipli asimptotik yaklaşımı ve iki değişkenli q - Bleimann, Butzer ve Hahn operatörlerinin Voronovskaya tipli asimptotik yaklaşımı elde edilmiştir.[2]

Anahtar Kelimeler. Bleimann Butzer Hahn operatörü , lineer pozitif operatörler,Korovkin teoremi, q-analiz, süreklilik modülü, lipschitz sınıfı

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Celal Cem Sarıoğlu	–
Cihan Okay	Bilkent University
Cihan Sahillioğulları	İzmir Institute of Technology
Cihat Aydın	Yıldız Teknik University
Çağatay Altuntaş	İstanbul Technical University
Çetin Dişibüyük	Dokuz Eylül University
Çınar Eren Arslan	Koç University
Derya Özdemir	İzmir Institute of Technology
Dilan Cantosun	İzmir Institute of Technology
Doğa Can Sertbaş	Çukurova University
Duygu Uysal	İzmir Institute of Technology
Ebru Nisa Koç	Çukurova University
Ece Hazal Korkmaz	İstanbul Technical University
Ecem Tıver	Dokuz Eylül University
Eda Nur Uzun	İzmir Institute of Technology
Ege Tamcı	İzmir Institute of Technology
Elif Ergül	İzmir Institute of Technology
Elif Güner	Kocaeli University
Elifnur Demirkol	İzmir Institute of Technology
Emre Akharman	İzmir Institute of Technology
Emre Yılmaz	Julius-Maximilians-Universität Würzburg
Engin Başakoğlu	Boğaziçi University
Engin Büyükaşık	İzmir Institute of Technology
Engin Mermut	Dokuz Eylül University
Engin Özkan	Ted University
Erdem Şafak Öztürk	Ankara University
Eren Şen	Middle East Technical University
Eren Canan	İzmir Institute of Technology
Ergün Yalçın	Bilkent University
Esma Dirican Erdal	Yeditepe University
Esmeray Yevimli	İzmir Institute of Technology
Esra Altıntaş	Ege University
Esra Başar	Yeditepe University

Ezgi Gürbüz	İzmir Institute of Technology
Ezgi Tutar	İzmir Institute of Technology
Faruk Temur	İzmir Institute of Technology
Fatih Çelik	Vefa Lisesi
Fatih Erman	İzmir Institute of Technology
Fatih İdiz	İzmir Institute of Technology
Fatma Zürnacı Yetiş	İstanbul Technical University
Fikriye Nuray Yılmaz	Gazi University
Gamze Alkaya	Gazi University
Gamze Akar	İstinye University
Gökhan Karahanoğulları	İzmir Institute of Technology
Gökhan Şahan	İzmir Institute of Technology
Gülter Budakçı	Dokuz Eylül University
Gürcihan Zaman	Dokuz Eylül University
Hakan Şanal	Dokuz Eylül University
Haleh Hamdi	İzmir Institute of Technology
Halil Oruç	Dokuz Eylül University
Hatice Topcu	Nevşehir Hacı Bektaş Veli University
Haydar Baran Yurtsever	İzmir Institute of Technology
Haydar Göral	İzmir Institute of Technology
Hazal Yüksekkaya	Dicle University
Hikmet Burak Özcan	İzmir Institute of Technology
İdem Susuzlu	İzmir Institute of Technology
İlayda Kaplan	Yıldız Teknik University
İrem Baydoğan	Middle East Technical University
İrem Zengin	İzmir Democracy University
İzzet Coşkun	University of Illinois at Chicago
Jan Stovicek	Charles University
Joshua Zahl	University of British Columbia
Julian Weigt	Aalto University
Kemal Cem Yılmaz	İzmir Institute of Technology
Kübra Akyıl	Nevşehir Hacı Bektaş Veli University
Kübra Karaağaç	Balıkesir University
Leyla Akbalık	İzmir Institute of Technology
Mehmet Kaymak	İzmir Institute of Technology
Melda Duman	Dokuz Eylül University
Melek Sofyalıoğlu	Ankara Hacı Bayram Veli University
Meliha Akcan	Nevşehir Hacı Bektaş Veli University
Meltem Adıyaman	Dokuz Eylül University
Meltem Uzun	İstanbul Gelişim University
Meltem Güllüsaç	Dokuz Eylül University
Mert Akman	İzmir Institute of Technology
Merve Bülbül	Gazi University
Merve Kahraman Ariman	Dokuz Eylül University
Musa Elsıkma	İzmir Institute of Technology
Mustafa Kırcalı	Middle East Technical University
Mustafa Kutay Kutlu	Dokuz Eylül University
Mustafa Özel	Dokuz Eylül University
Müge Diril	İzmir Institute of Technology
Nazlıcan Ata	İzmir Institute of Technology
Negar Bakhshi	Farhanghyan University
Neslihan Güneş	İzmir Institute of Technology
Nesrin Yakar	İzmir Institute of Technology
Nihal Taş	Balıkesir University
Nihan Tanısalı	Koç University
Nurdan Poyraz	–
Oktay Pashaev	İzmir Institute of Technology
Olha Ivanyshyn Yaman	İzmir Institute of Technology
Onur Aytaç	İzmir Institute of Technology
Orhun Kara	İzmir Institute of Technology
Osman Hamza	Yıldız Teknik University
Oğuz Şavk	Boğaziçi University & Max Planck Institute for Mathematics
Oğuz Yılmaz	İzmir Institute of Technology
Özgür Ege	Ege University
Özlem Irmak Demir	İzmir Institute of Technology
Özlem Moralı Kızanlık	Balıkesir University

Pınar Eroğlu	Dokuz Eylül University
Pınar Şaşmaz	Muğla Sıtkı Koçman University
Rabia Atasoy	İzmir Institute of Technology
Rabia Ayan	Yıldız Teknik University
Refail Alizade	Yaşar University
Sabahat Defne Plattürk	İzmir Institute of Technology
Sabri Kaan Gürbüzer	Dokuz Eylül University
Sadık Eyidoğan	Çukurova University
Salahattin Özdemir	Dokuz Eylül University
Saliha Kıvanç	Hacettepe University
Seda Arslan	İzmir Institute of Technology
Selçuk Demir	Dokuz Eylül University
Selin Erdal	Ankara Hacı Bayram Veli University
Sena Nur Karataş	Manisa Celal Bayar University
Seven Burçin Çellek	İzmir Institute of Technology
Seçil Gergün	Dokuz Eylül University
Shodijon Ismoilov	İzmir Institute of Technology
Sinem Benli Göral	İzmir Institute of Technology
Sinem Onaran	Hacettepe University
Sueda Nur Uysal	İzmir Institute of Technology
Süleyman Cengizci	Rice University
Sultan Eylem Toksoy	Hacettepe University
Şermin Çam Çelik	İstanbul Bilgi University
Şeyhmus Can	İzmir Institute of Technology
Şeyma Yaşar	Gebze Technical University
Şirin Atılgan Büyükaşık	İzmir Institute of Technology
Şule Kılıçaslan	Dokuz Eylül University
Tansılu Altay	İzmir Institute of Technology
Tina Beşeri Sevim	İzmir Institute of Technology
Turgay Akyar	Middle East Technical University
Tuğba Yazan	İzmir Institute of Technology
Tuğrul Cömert	Dicle University
Türker Özsarı	Bilkent University
Türkü Özlüm Çelik	Boğaziçi University
Uyen Enni Le	West Virginia University
Victor Blasco	Dokuz Eylül University
Yaren Naz Tekingündüz	İzmir Institute of Technology
Yasemin Soylu	Giresun University
Yeşim Demiroğlu Karabulut	California Institute of Technology
Yıldız Oruklu	İzmir Institute of Technology
Yılmaz Selçuk Bilgi	İzmir Institute of Technology
Yonca Ünver	Amasya University
Zehra Çayiç	İzmir Institute of Technology
Zehra Tuncer	Dokuz Eylül University
Zeynep Üstün	İzmir Institute of Technology
Zeynep Kara	Gazi University
Zübeyir Türkoğlu	Dokuz Eylül University
Zümra Bulut	İzmir Institute of Technology