SELÇUK UNIVERSITY KONYA - 1975

ICOMSS A Selcuk Meeting

International E-Conference on Mathematical and Statistical Sciences: A Selçuk Meeting

Book of Abstracts

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INTERNATIONAL E-CONFERENCE ON MATHEMATICAL AND STATISTICAL SCIENCES: A SELÇUK MEETING (ICOMSS'22)

October 20 – October 22, 2022

Selçuk University, Konya

https://icomss22.selcuk.edu.tr

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Proceedings

Proceeding Book:

- 2022 Proceedings of International E-Conference on Mathematical and Statistical Sciences: A Selçuk Meeting (ISBN: 978-625-00-9195-1)

Special Issues:

- Carpathian Mathematical Publications
- Complex Manifolds
- Dolomites Research Notes on Approximation
- Istatistik Journal of The Turkish Statistical Association

Message from Chair

It's my pleasure to chair The International Conference on "International E-Conference on Mathematical and Statistical Sciences: A Selçuk Meeting". Our 2022 conference, which is organized by the Faculty of Science of Selçuk University and supported by Scientific Research Projects Coordinatorship of Selçuk University. By organizing this e-conference, our main was the to promote, encourage, and provide a forum for the academic exchange of ideas and recent research works. The conference present new results and future challenges, in a series of virtual keynote lectures and virtual contributed short talks. In our conferences, we provide a forum for mathematicians and statistician to communicate recent research results in the areas of Algebra and Applied Mathematics, Analysis, Geometry and Topology, Actuarial Science, Applied Statistics and Statistical Theory. The conference were only online and there was no registration fee, and only one presentation was allowed for each participants. The all presentation language was English, and submissions were be peer-reviewed by at least two referees. It was the first but it will not be the last. I hope to organize this Conference in our university Konya, Turkiye and see you all.

I am thankful to the management of Selçuk University for providing the necessary support to organize this event. I am also thankful to all scientific committee members, organizing committee members, the session chairs, and the numerous volunteers, without their generous contributions this conference would not have set this number of presentations and participants.

Thanks.

Prof. Dr. Semahat Küçükkolbaşı
Dean of Faculty of Science
Selçuk University
Chair of ICOMSS'22

PROGRAMME

20 OCTOBER 2022

ICOMSS'22 PROGRAM

Time (GMT +03:00)	ID	Chair	S1	Chair	S2	Chair	S3
09.00-09.30	OPENING		PROF. DR. METİN AKSOY (RECTOR of SELÇUK UNIVERSITY, HONORARY CHAIR)				Zoom link
			PROF. DR. SEMAHAT KÜÇÜKKOLBAŞI (DEAN OF FACULTY OF SCIENCE, CHAIR)				
	ID		MATHEMATICS				
09.30-10.10	1	Tuncer Acar	Invited Speaker: Ekrem Savaş				Zoom link
10.10-10.50	2	Tuncer Acar	Invited Speaker: Vasile Berinde				
BREAK (10 MIN.)							
			S1 Zoom link		S2 Zoom link		S3 Zoom link
11.00-11.15	3	Haldun A. Peker	I. Ahmed	Tuncer Acar	D. Achour	Özlem Acar	S. O. Yurttaş
11.15-11.30	4		S. Alizadeh		H. E. Altin		E. Korkmaz
11.30-11.45	5		A. Altoum		M. Turgay		H. F. Akız
11.45-12.00	6		A. Bekkai		K. İ. Atabey		H. A. Erdem
12.00-12.15	7		N. Bendjazia		A. Bouabsa		L. Bilen
BREAK (45 MIN.)							
13.00-13.15	8	Güner Topcu	Y. Alagoz	Tuncer Acar	S. Bulut	Mahpeyker Öztürk	Ö. Acar
13.15-13.30	9		M. A. Özarslan		T. Buric		E. Girgin
13.30-13.45	10		T. A. Khalifa		A. Cernea		N. B. Güngör
13.45-14.00	11		B. Aydın		M. Ceylan		M. B. Nazam
14.00-14.15	12		K. Boumzough		S.Chatterjee		A. Büyükkaya
14.15-14.30	13		G. B. Ekinci		I. Charnega		A. S. Özkapu
14.30-14.45	14		V. Cam		F. Chouaou		M. Eslamian
BREAK (15 MIN.)							
15.00-15.40	15	Tuncer Acar	Invited Speaker: Stefano De Marchi				Zoom link
BREAK (5 MIN.)							
15.45-16.00	16	Güner Topcu	T. Azizi	Tuncer Acar	E. Dahia	Dilek Söylemez Özden	S. Güler
16.00-16.15	17		M. I. Berenguer		S. Daptari		B. Mahmoud
16.15-16.30	18		B. A. B. Abdelmalek		I. Denega		H. Wang
16.30-16.45	19		S. Cengizci		F. Dirik		M. P. D. Angulo
16.45-17.00	20		M. Chaudhary		E. Doubtsov		F. C. Perez
17.00-17.15	21		I. Hay		S. E. Almalı		H. İ. Arıcı
17.15-17.30	22				A. A. F. Arif		
17.30-17.45	23				B. Gheribi		
17.45-18.00	24				V. Gupta		
18.00-18.15	25				D. Özer		
18.15-18.30	26				Nazlım Deniz Aral		

ID	Titles of the talks	
1	Ekrem Savaş	Almost Lacunary Strong (A, ϕ)- convergence of Order α
2	Vasile Berinde	A Unified Treatment of Some Convergence Theorems for Fixed Point Algorithms in the Class of Demicontractive Mappings
15	Stefano De Marchi	(β, γ)-Chebyshev Functions and Points of the Interval and Some Extensions
	S1	
3	I. Ahmed	Analysis of a Fractional-order Cholera Epidemic Model and its Sensitivity Analysis
4	S. Alizadeh	Characteristic Properties of Scattering Data for a Schrödinger Equations with Discontinuities in an Interior Point
5	A. Altoum	Public-key Authentication Schemes Based on the Hidden Discrete Logarithm Problem
6	A. Bekkai	The Critical Exponent for a Time-fractional Schrödinger Equation

7	N. Bendjazia	Using Reproducing Kernel for Solving Third-order Boundary Value Problems
8	Y. Alagöz	Weak Projective Modules
9	M. A. Özarslan	Lifting of Conjugate Idempotents
10	T. A. Khalifa	A Random Generation Problem in the Substitution Group of Formal Power Series
11	B. Aydın	Exponential Zagreb Indices of Graphs
12	K. Boumzough	Incomplete LU Factorization Preconditioners Using Two Methods of Storing a Sparse Matrix
13	G. B. Ekinci	On the Reliability of Rose Window Graphs
14	V. Cam	On Purely Infinite Ideals of Leavitt Path Algebra
16	T. Azizi	Studying the Geometry of Alzheimer’s Disease Toward Better Cognitive Assessment
17	M. I. Berenguer	Numerical Solution of Linear Equations of the Second Kind and Associated Inverse Problems
18	B. A. B. Abdelmalek	Fractional Hilbert Space Operator: Influence of Fractional Derivatives on the One-dimensional Harmonic Oscillator
19	S. Cengizci	Stabilized Finite Element Simulations of Dam-break Problems
20	M. Chaudhary	A Mathematical Model on Impact of Meditation on Suicidal Thoughts
21	I. Hay	Iterative Approximation of a Common Solution of a Split Equilibrium Problem and a Fixed Point Problem in a Hilbert Space
22		
23		
24		
25		
	S2	
3	D. Achour	Lipschitz Operator Ideals
4	H. E. Altin	An Introduction to Nonlinear Baskakov-Durrmeyer Operators with its Approximation Properties
5	M. Turgay	Approximation by Bivariate Generalized Sampling Series in Weighted Spaces of Functions
6	K. İ. Atabey	Deferred Statistical Boundedness of Order α on Time Scale
7	A. Bouabsa	Bounded Variation Solution to Time Dependent Maximal Monotone Operator with Integral Perturbation
8	S. Bulut	On Rough Convergence and its Some Generalizations
9	T. Buric	Asymptotic Expansion of the Compound Mean with Application to the Arithmetic-geometric Mean
10	A. Cernea	On the Existence of Solutions for a Class of Hilfer-Hadamard Fractional Integro-differential Inclusions
11	M. Ceylan	Generalized Difference Interval Matrix Definition and Some Interval Matrix Calculations
12	S.Chatterjee	On the Structure of the Fatou Set of a Certain Family of Transcendental Entire Functions
13	I. Chernega	Supersymmetric Polynomials and a Set of Multisets
14	F. Chouaou	Stabilization of Degenerate Wave Equation Under Fractional Feedback Acting on the Degenerate Boundary
16	E. Dahia	A Class of Lipschitz Operators Represented by Vector Measures
17	S. Daptari	Hahn-Banach Smoothness in Sequence Spaces
18	I. Denega	Some Unsolved Problems on Extremal Decomposition of the Complex Plane
19	F. Dirik	Ψ−Ideal Convergence of Double Positive Linear Operators of Functions of Two Variables for Analytic P-ideals
20	E. Doubtsov	Calderon-Zygmund Operators on Regular BMO Spaces
21	S. E. Almalı	Weighted Pointwise Convergence of Some Multidimensional Nonlinear Integral Operators at μ-p-point
22	A. A. F. Arif	The Ordered Implicit Relations and Related Fixed Point Problems in the Cone b-Metric Spaces

23	B. Gheribi	Composition in Besov Type Space
24	V. Gupta	Kantorovich Operators of Order j Based on Pòlya Distribution
25	D. Özer	Convergence of a Family of Sampling-Durrmeyer Operators in Weighted Spaces of Functions
26	Nazlım Deniz Aral	On Deferred Harmonic Summability of Order α
	S3	
3	S. O. Yurttaş	Addition of Multicurves on Surfaces
4	E. Korkmaz	On the Notion of Sobriety in the Setting of Diframes
5	H. F. Akız	γ-b-I Connectedness
6	H. A. Erdem	Cartan Null and Pseudo Null Bertrand Curves in Minkowski 3-Space Revisited
7	L. Bilen	Conformal Vector Fields and Geometric Solitons on the Tangent Bundle with the Ciconia Metric
8	Ö. Acar	A New Approach to Fixed Point Theory via Integral Type Mappings on Orthogonal Metric Space
9	E. Girgin	Fixed Points of Simulative Contraction in Super Metric Spaces
10	N. B. Güngör	Fixed Point Theorems in Orthogonal Metric Spaces via w-Distances
11	M. B. Nazam	Best Proximity Points of Proximal Interpolative Contractions
12	A. Büyükkaya	Multivalued Sehgal-Proinov Type Contraction Mappings Involving Rational Terms in Modular Metric Spaces
13	A. S. Özkapu	A Result for Multivalued Mappings on Ultrametric Space
14	M. Eslamian	Inertial Halpern-type Iterative Algorithm for Split Common Fixed Point Problem in Banach Spaces
16	S. Güler	A Note On Spherical Fuzzy Topological Spaces
17	B. Mahmoud	Classification of Algebraic Homotopy Types and Whitehead Exact Sequence
18	H. Wang	Quaternions Associated to Curves and Surfaces
19	M. P. D. Angulo	Isotropic Surfaces in the De Sitter Space $S^3_1(1) \subset R^4_1$ via Complex Variables
20	F. C. Perez	Pseudo-contractictibity on Topological Spaces
21	H. İ. Arıcı	New Results on Timelike Mannheim Curves in Minkowski 3-Space

20 OCTOBER 2022						
ICOMSS'22 PROGRAM						
Time (GMT +03:00)						
09.00-09.30	OPENING	PROF. DR. METİN AKSOY (RECTOR of SELÇUK UNIVERSITY, HONORARY CHAIR)				Zoom link
		PROF. DR. SEMAHAT KÜÇÜKKOLBAŞI (DEAN OF FACULTY OF SCIENCE, CHAIR)				
	ID	STATISTICS				
10.10-10.50	1	C.Kuş	Invited Speaker: İsmihan Bayramoğlu			Zoom link
BREAK (10 MIN.)						
			S5 (Zoom link)		S6 (Zoom link)	
11.00-11.15	2	F. Kalkan	O. Güler	K. Karakaya	K. Karakaya	
11.15-11.30	3		İ.H. Kınalıoğlu		N.I. Badmus	
11.30-11.45	4		A.C. Kalu		A. Bektaş Kamışlık	
11.45-12.00	5		S. Modak		S. Sert	
12.00-12.15	6		A. Bhattacharya		R. N. Şahin	
BREAK (45 MIN.)						
13.00-13.15	7	İ. Kınacı	B.R. Wagle	S. Sert	A. Badreddine	
13.15-13.30	8		I. O. Ude		O.T. Babatunde	
13.30-13.45	9		E.A. Stefanecsu-A.C. Cirstea		A. Stepanov	
13.45-14.00	10		D.Sezer		İ. Ghosh	
14.00-14.15	11		S. Ferreira		A. Halder	
14.15-14.30	12		A. Guiatni			
14.30-14.45	13		B. Leila			
BREAK (15 MIN.)						
15.00-15.40	14	İ. Bayramoğlu	Invited Speaker: N. Balakrishnan			Zoom link
15.45-16.00	15	T. Erbayram	N. İyit			
16.00-16.15	16		P. N. Ezra			
16.15-16.30	17		Y. Zhao			
16.30-16.45	18		L. Palayangoda			
16.45-17.00	19		S. Xie			
17.00-17.15	20		J. Rychtar			

ID	Titles of the talks	
1	İsmihan Bayramoğlu	On new properties of conditional expectation and their applications
14	N. Balakrishnan	Cumulative residual and relative cumulative residual Fisher information and their properties
S5		
2	O. Güler	Predicting Bitcoin Volatility via Gramian Angular Fields and Deep Learning
3	İ.H. Kınalıoğlu	Classification of Eye Diseases Based on Retinal Images Using Deep Learning
4	A.C. Kalu	On Establishing Empirical Relationship Between Global Crude Oil Market and the Nigerian Stock Exchange Using Vector Autoregressive Model
5	S. Modak	A New Interpoint Distance-based Clustering Algorithm Using Kernel Density Estimation
6	A. Bhattacharya	A Unified Generalized Process Capability Index for Logistic-exponential Distribution
7	B.R. Wagle	Closed Queueing Network Analysis of Vehicle Sharing in a City
8	I. O. Ude	Robustness of Randomization Tests for Repeated Measures Design
9	E.A. Stefanecsu-A.C. Cirstea	A Method to Build your own Autonomous Weather Station and to Validate It with Tools of Statistical Mathematics

10	D.Sezer	The Effect of Reinsurance Contracts on Ruin Probability
11	S. Ferreira	Certain Results on Cumulants and Higher Order Probability Distribution Cumulants
12	A. Guiatni	Economic Trend Resistant Designs Based on Hadamard Matrices
13	B. Leila	Standard M/G/1 Queue with Preemptive Repeat Priority and Lose of Lower Priority Demands
15	N. İyit	Emphasising the Mortality Path for Adulthood and Senescent Period Using Mathematical Growth Models
16	P. N. Ezra	Optimization of Financial Planning of Enugu State Broadcasting Service (ESBS)
17	Y. Zhao	Jackknife Empirical Likelihood Inference for the Mean Difference of Two Zero-inflated Skewed Populations
18	L. Palayangoda	Evaluation of Mean-Time-To-Failure Based on Nonlinear Degradation Data with Applications
19	S. Xie	Clinical Data Analysis for an Anti-Tuberculosis Treatment
20	J. Rychtar	Unified Approach to Optimal Estimation of Mean and Standard Deviation from Sample Summaries
	S6	
2	K. Karakaya	Unit Generalized Marshall-Olkin Weibull Distribution: Properties and Application
3	N.I. Badmus	Exponentiated New Modified Weighted Rayleigh Distribution with Application
4	A. Bektaş Kamışlık	Peaks Over Threshold Estimation for Ergodic Distribution of a Semi-Markovian Inventory Model
5	S. Sert	Interval Estimation for the Poisson Regression with Lognormal Unobserved Heterogeneity
6	R. N. Şahin	Modified Unit Exponential Distribution
7	A. Badreddine	Convergence of a Processes Under Dependent Assumptions
8	O.T. Babatunde	Robust Calibration Estimation of Population Mean in Stratified Sampling in the Presence of Outlier
9	A. Stepanov	Asymptotic Properties of Spacings
10	İ. Ghosh	Some Properties of Stop-loss Moments Under Biased Sampling
11	A. Halder	Spatial Risk Estimation in Tweedie Compound Poisson Double Generalized Linear Models

21 OCTOBER 2022

ICOMSS'22 PROGRAM

Time (GMT +03:00)	ID	MATHEMATICS						
09.30-10.10	1	Tuncer Acar	Invited Speaker: Erdal Karapınar					Zoom link
10.10-10.50	2	Tuncer Acar	Invited Speaker: Francesco Altomare					Zoom link
BREAK (10 MIN.)								
			S1 Zoom link		S2 Zoom link		S3 Zoom link	
11.00-11.15	3	Güner Topcu	A. Emin	Tuncer Acar	P. M. Berna	Mahpeyker Öztürk	K. Özkan	
11.15-11.30	4		F. G. Infusino		İ. Gökcan		E. Erdoğan	
11.30-11.45	5		M. J. Atteya		D. Haldar		Y. S. Şahin	
11.45-12.00	6		A. H. Mokhtari		R. Haoua		M. Şenocak	
12.00-12.15	7		R. F. O. Cruz		Y. Henka		S. Beyendi	
BREAK (45 MIN.)								
13.00-13.15	8	Haldun A. Peker	A. G. Farzullazadeh	Fırat Özsaraç	S. I. Bradanovic	Özlem Acar	Z. Kaddour	
13.15-13.30	9		R. Farzullazadeh		H. İnci		E. Karakaş	
13.30-13.45	10		H. Fatima		J. Jaksetic		E. Karataş	
13.45-14.00	11		S. Halder		A. Kajla		A. Mohammed	
14.00-14.15	12		İ. Gölgeleyen		J. Kaur		A. N. Siddiqui	
14.15-14.30	13		N. Irkil		S. Khafagy		I. Stanimirovic	
14.30-14.45	14		H. Ismail		A. Kicha		F. Yıldız	
BREAK (15 MIN.)								
15.00-15.40	15	Harun Karslı	Invited Speaker: Borislav R. Draganov					Zoom link
BREAK (5 MIN.)								
15.45-16.00	16	Vural Cam	N. Kartal	Harun Karslı	E. Z. Kotonaj			
16.00-16.15	17		H. Karakaya		H. Stier			
16.15-16.30	18		D. Kumar		S. Majee			
16.30-16.45	19		M. Ladjimi		A. Menad			
16.45-17.00	20		M. Mehdaoui		L. Mihokovic			
17.00-17.15	21				A. Najdiba			
17.15-17.30	22				M. Natale			
17.30-17.45	23				Z. Novosad			
17.45-18.00	24				M. Piconi			
18.00-18.15	25				F. Özsaraç			
18.15-18.30	26				A. Abolarinwa			

ID	Titles of the talks	
1	Erdal Karapınar	Certain Remarks on the Recent Publications on Metric Fixed Point Theory
2	Francesco Altomare	Local Approximation Problems and Korovkin-type Theorems
15	Borislav R. Draganov	Verifying Approximation Estimates for Convolution Operators in Homogeneous Banach Spaces
	S1	
3	A. Emin	Studying the Terms of Triangular Heptagonal Numbers
4	F. G. Infusino	On the Prekernels of Reflective Modifications of Concrete Categories
5	M. J. Atteya	σ-Derivations on Operators Algebras
6	A. H. Mokhtari	Evaluating Lie Centralizers on Some Spaces
7	R. F. O. Cruz	Triangular Matrix Categories Over Path Categories and Quasi-hereditary Categories, as well as One-Point Extensions by projectives
8	A. G. Farzullazadeh	Intermittency of the Eigenvalues of the Dirac Operator
9	R. Farzullazadeh	A Uniqueness Theorem for Sturm-Liouville Equations with a Spectral Parameter Nonlinearly Contained in the Boundary Condition

10	H. Fatima	Finite Volume Relaxation Method for Hyperbolic Systems of Multiphase Flows
11	S. Halder	A Modified Leslie-Gower Predator-Prey Mathematical Model with Fear Effect on Prey
12	İ. Gölgeleyen	An Identification Problem for a Differential-Difference Equation with an Integral Term
13	N. Irkil	Blow-up Result of Solutions for Hyperbolic Type Equations with Degenerate Viscoleastic and Logarithmic Source Term
14	H. Ismail	Non-linear Elliptic Unilateral Problems and L 1 Data in Orlicz Spaces Having Two Lower-order Terms
16	N. Kartal	Dynamics of a Star Network in Discrete Fractional Order Biological Model
17	Ş. Kartal	Neimark-Sacker Bifurcation Analysis in a Population Model
18	D. Kumar	A Revisit to Some Generalized Functions Used in Applied Analysis and Astrophysics
19	M. Ladjimi	Existence of Solutions of Nicholson’s Blowflies Differential Equations with Conformable Derivative
20	M. Mehdaoui	Mathematical Analysis of an Optimal Control Problem for a Generalized Reaction-diffusion System Arising in Epidemiology
21		
22		
23		
24		
25		
25		
S2		
3	P. M. Berna	New Results About Lebesgue-type Parameters in Greedy Approximation Theory
4	İ. Gökcan	Identities and Approximations Obtained by Special Vertices of the Suborbital Graphs and Some Special Sequences
5	D. Haldar	p-Adic Multiframelets and its Dual
6	R. Haoua	On Elliptic Equations with General Robin Boundary Conditions in UMD Spaces
7	Y. Henka	Chebyshev Polynomials of Second Kind to Approximate Nonlinear Singular Fredholm Integro-Differential Equations
8	S. I. Bradanovic	Refinements of Majorization Theorems via Strong Convexity with Application
9	H. İnci	On Some Well-posedness Issues of the Inviscid Burgers Equation on Sobolev Spaces
10	J. Jaksetic	One Concave-Convex Inequality and its Consequences
11	A. Kajla	Bezier Baskakov-Durrmeyer Type Operators
12	J. Kaur	Approximation of Function by $\alpha-$Baskakov Durrmeyer Type Operators
13	S. Khafagy	Stability of Positive Weak Solutions for Nonlinear System Involving (p; q)-Laplacian
14	A. Kicha	h-stabilization of Perturber Time-varying Nonlinear Systems
16	E. Z. Kotonaj	Unbounded Quasi-normed Convergence in Quasi-normed Lattices and Some Properties of Lp- spaces for 0<p<1
17	H. Stier	Limiting Sequential Decompositions and Applications in Finance
18	S. Majee	Spider’s Web Structure on Quite Fast Escaping Set
19	A. Menad	On Some Diffusion Problems with Interfaces and Concrete Applications
20	L. Mihokovic	Asymptotic Expansions of the Archimedean Compounds
21	A. Najdiba	Relaxation of an Evolution Problem Involving Time-depent Maximal Monotone Operators
22	M. Natale	Approximation by Nonlinear Multivariate Sampling Kantorovich Operators and Quantitative Estimates
23	Z. Novosad	Topological Mixing Shift Operator
24	M. Piconi	Approximation by Durrmeyer-sampling Type Operators: Quantitative Estimates in Functional Spaces

25	F. Özsaraç	Convergence Theorems with a New Type Modulus of Continuity in the Locally Integrable Function Space
26	A. Abolarinwa	Nonlinear Variable Exponent Picone Identity for General Vector Fields and Applications
	S3	
3	K. Özkan	Jungck's Fixed Point Theorem for Weakly Compatible Mappings Satisfying Orthogonal F-contraction
4	E. Erdoğan	The New Aspect to Fixed Point Theory on Orthogonal Metric Space
5	Y. S. Şahin	Results for Some Classes of Interpolative Contractions in Convex B-metric Spaces
6	M. Şenocak	A Fixed Point Theorem in Extended Fuzzy Metric Spaces
7	S. Beyendi	Some Results on Sasakian Manifolds with Non-Symmetric Non-Metric Connection
8	Z. Kaddour	Bi-symphonic Maps Between Riemannian Manifolds
9	E. Karakaş	Some Special Vector Fields on a Tangent Bundle with a Ricci Quarter-symmetric Metric Connection
10	E. Karataş	Schouten Connection in Transversal Lightlike Submersions
11	A. Mohammed	Some Results for f-minimal Hypersurfaces in Manifolds with Density
12	A. N. Siddiqui	Almost Generalized Ricci Solitons and Gradient Almost Generalized Ricci Soliton on Trans Para Sasakian Manifolds
13	I. Stanimirovic	Generalization of the Geometrical Method of Linear Programming in n-dimesional Space
14	F. Yıldız	The Inverse Limits of Dicompact Bi-Hausdorff Spaces
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21 OCTOBER 2022				
ICOMSS'22 PROGRAM				
Time (GMT +03:00)	ID	STATISTICS		
15.00-15.40	1	H.K.T. Ng	H.K.T. Ng	Zoom link
15.40-16.20	2		Haikady Nagaraja	
BREAK (10 MIN.)				
		S5: Advanced Models for Lifetime Data		Zoom link
16.30-16.45	3	S. Pal	S. Pal	
16.45-17.00	4		S. Roy	
17.00-17.15	5		H.Y. So	
17.15-17.30	6		F.S. Milienos	

ID	Titles of the talks	
1	H.K.T. Ng	Semiparametric and Nonparametric Evaluation of First-Passage Distribution of Bivariate Degradation Processes
2	Haikady Nagaraja	Large-Sample Properties of Jackknife Estimators of the Variance of a Sample Quantile
S5: Advanced Models for Lifetime Data		
3	S. Pal	A New Machine Learning-Based Cure Rate Model
4	S. Roy	A Projected Non-linear Conjugate Gradient Algorithm for Parameter Estimation in a Cure Rate Model
5	H.Y. So	Semiparametric Inference in One-shot Device with Competing Risks
6	F.S. Milienos	On Cure Rate Modelling: Some Theoretical and Practical Aspects

22 OCTOBER 2022							
ICOMSS'22 PROGRAM							
Time (GMT +03:00)	ID	MATHEMATICS					
09.30-10.10	1	Tuncer Acar	Invited Speaker: Ioan Raşa				Zoom link
10.10-10.50	2		Invited Speaker: Calogero Vetro				
BREAK (10 MIN.)							
			S1 (Zoom link)			S2 (Zoom link)	
11.00-11.15	3	Vural Cam	A. Moumni	Fırat Özsaraç		M. Bodur	
11.15-11.30	4		Z. Mısır			F. Esposito	
11.30-11.45	5		F. Nudo			Y. Rachid	
11.45-12.00	6		G. Topcu			S. Sadov	
12.00-12.15	7		B. Youssra			S. Sahoo	
BREAK (45 MIN.)							
13.00-13.15	8	Vural Cam	F. Rania	Murat Bodur		S. Saidi	
13.15-13.30	9		A. Roy			M. Sertbaş	
13.30-13.45	10		N. Şahin			N. Sharma	
13.45-14.00	11		Ö. Taşdemir			T. Acar	
14.00-14.15	12		U. Ustaoğlu			P. Sharma	
14.15-14.30	13		T. Özdin			K. S. Kalamir	
14.30-14.45	14		Z. Özkurt			N. Somia	
BREAK (15 MIN.)							
15.00-15.40	15	Harun Karslı	Invited Speaker: Gianluca Vinti				Zoom link
BREAK (5 MIN.)							
15.45-16.00	16	Haldun A. Peker	G. Ç. Kızılkan	Harun Karslı		S. Kursun	
16.00-16.15	17		F. A. Çuha			A. Travaglini	
16.15-16.30	18		I. Öner			A. Aral	
16.30-16.45	19		Z. Özdemir			B. I. Vasian	
16.45-17.00	20		A. Adoui			A. Vinskovska	
17.00-17.15	21					K. Voitovych	
17.15-17.30	22					V. V. Volchkov	
17.30-17.45	23					S. Yıldız	
17.45-18.00	24					N. Yılmaz	
18.00-18.15	25					N. Ş. Bayram	
18:15	CLOSING CERENOMY						

ID	Titles of the talks	
1	Ioan Raşa	Functional Equations Related to Appell Polynomials and Heun Functions
2	Calogero Vetro	A Galerkin Approach to the Solution of Anisotropic Kirchhoff-type Problems with Convection Term
15	Gianluca Vinti	A Mathematical Model for the Study of Vascular Patologies
	S1	
3	A. Moumni	Control of a Degenerate and Singular Wave Equation in Cylindrical Domain
4	Z. Mısır	Energy Decay of Solutions for an Inverse Problem with Variable-exponent
5	F. Nudo	Constrained Mock-Chebyshev Least Squares Quadrature
6	G. Topcu	Properties of Hurwitz Stable Matrix Families
7	B. Youssra	A Large-update of Interior-point Methods for Convex Quadratic Programming Based on a Parametric Kernel
8	F. Rania	Power-central Valued b-generalized Derivation on Lie Ideals in Prime and Semiprime Rings
9	A. Roy	Chordal Graphs, Higher Independence Complexes and their Stanley-Reisner Ideal

10	N. Şahin	On the Equivalence of Being Homogeneous and Homogeneous Type for 4-generated Pseudo Symmetric
11	Ö. Taşdemir	On AC2-Modules
12	U. Ustaoğlu	Computing Syzygy Modules and H-bases Using Linear Algebraic Methods
13	T. Özdin	Operators on Regular Rings of the Leavitt Path Algebras
14	Z. Özkurt	On Free Nilpotent Leibniz Algebras
16	G. Ç. Kızılkan	On the Oscillation of Discrete Time Switched Linear Systems
17	F. A. Çuha	Kashuri Fundo Transform for Solving Chemical Reaction Models
18	I. Öner	The Null Boundary Controllability for the Mullins Equation with Periodic Boundary Conditions
19	Z. Özdemir	Newton Method with IDDM
20	A. Adoui	On Sequential Riemann-Liouville Fractional Differential Equations with Infinite Delay
	S2	
3	M. Bodur	Bivariate Baskakov Operators Preserving Exponential Functions
4	F. Esposito	An Hopf-type Lemma for Elliptic Problems Involving Singular Nonlinearities
5	Y. Rachid	Maurey-Rosenthal Type Theorems on Factorization Through L^p-spaces.
6	S. Sadov	Beyond Shapiro's Problem: from Cyclic Sums to ''Graphic'' Sums
7	S. Sahoo	On Fatou Sets Containing Baker Omitted Value
8	S. Saidi	A Fixed Point Approach to Study a Differential Inclusion with Subdifferentials
9	M. Sertbaş	Degenerate Conformable Fractional α-order Differential Operator
10	N. Sharma	On Univalent Function Theory
11	T. Acar	Pointwise Convergence Results for Exponential Sampling Durrmeyer Operators
12	P. Sharma	Study of Some Approximation Estimates Concerning Convergence of (p, q)-variant of Linear Positive Operators
13	K. S. Kalamir	Weighted Hermite-Hadamard Inequalites via Steffensen's Inequality and Lidstone Interpolating Polynomial
14	N. Somia	On the Existence and Uniqueness of Solution for the Riesz Fractional Derivative Equation
16	S. Kursun	Some Results of Generalized Kantorovich Exponential Sampling Series in Logarithmic Weighted Spaces
17	A. Travaglini	Sampling Kantorovich Algorithm for the Detection of Alzheimer's Disease
18	A. Aral	On the Modification of Baskakov-Kantorovich Type Operators Preserving Exponential Functions
19	B. I. Vasian	Approximation Properties of Some Non-positive Kantorovich Type Operators
20	A. Vinskovska	Criterium of Nontriviality of Solutions of a Convolution Type Equation
21	K. Voitovych	On Antisymmetry of Boundary Values
22	V. V. Volchkov	An Analogue of Carleman’s Tangent Approximation Theorem
23	S. Yıldız	An Extension of Korovkin Theorem via P-Statistical A-summation process
24	N. Yılmaz	Smoothing Levenberg-Marquardt Algorithm for Solving Non-Lipschitz Absolute Value Equations
25	N. Ş. Bayram	Construction of Bivariate Modied Bernstein-Chlodowsky Operators and Approximation Theorems

22 OCTOBER 2022				
ICOMSS'22 PROGRAM				
Time (GMT +03:00)	**ID**	**STATISTICS**		
15.00-15.40	**1**	**S. Eryılmaz**	Barry Arnold	Zoom link
15.40-16.20	**2**		Serkan Eryılmaz	
18:15	**CLOSING CERENOMY**			

ID	Titles of the talks
1	Model Building Using Independent Gamma Distributed Components
2	Discrete Time Reliability Systems and Some Optimization Problems

Contents

INVITED TALKS

Model Building Using Independent Gamma Distributed Components

Barry C. Arnold

Department of Statistics, University of California, Riverside, USA

barnold@ucr.edu

key-words: Cure-rate, optimization, cancer.

Abstract:
Olkin and Liu (2003) popularized an existing bivariate beta model involving 3 independent gamma distributed components. Arnold and Ng (2011) investigated a more flexible model involving 8 gamma distributed components. Several related bivariate and multivariate models involving independent gamma distributed components will be discussed. The flexible bivariate beta(2) model introduced by Arnold and Ng (2011) provides the template for other models. It involved ratios of sums of independent gamma variables. The parallel model with beta(1) marginals includes a multi-parameter family of copulas exhibiting a variety of dependence structures. The other models involve differences, sums, products and minima of sums of gamma distributed components rather than ratios.

References

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Cumulative Residual and Relative Cumulative Residual Fisher Information and their Properties

Narayanaswamy Balakrishnan

Department of Mathematics and Statistics, McMaster University, Hamilton, Ontario, Canada

bala@mcmaster.ca

key-words: Fisher information, entropy information, cumulative residual information, relative cumulative residual information, Jensen information measures, information generating function.

Abstract:
In this talk, I will first give a brief review of Fisher and entropic information measures. Then, I will introduce the notions of cumulative residual and relative cumulative residual Fisher information measures and establish some of their key properties. I will present a connection to de Bruijn's identity, and then present Jensen-versions of these information measures. Finally, I will prove some relationships between Jensen cumulative residual entropic and Jensen cumulative residual Fisher information measures.

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On New Properties of Conditional Expactions and Their Applications

Ismihan Bayramoglu

Department of Mathematics, Izmir University of Economics, Izmir, Türkiye

ismihanbayramoglu@ieu.edu.tr

key-words: Per-share price of stock markets, random variables, conditional expectations, martingale, Markov processes.

Abstract:
One of the important concepts of Probability and Statistics is the concept of conditional expectation. Conditional expectations with respect to a sigma-algebra have many applications in probability and statistics and also in many areas such as reliability engineering, economy, finance, and actuarial sciences due to its property of being the best predictor of a random variable as a function of another random variable. This concept also is essential in the martingale theory and theory of Markov processes. Even though, there has been studied and published many interesting properties of conditional expectations with respect to a sigma-algebra generated by a random variable it still remains an attractive subject having interesting applications in many fields. We present some new properties of the conditional expectation of a random variable given another random variable and describe useful applications in problems of per-share-price of stock markets. The copula and dependence properties of conditional expectations as random variables are also studied. We present also some new equalities having interesting applications and results in martingale theory and Markov processes.

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A Unified Treatment of Some Convergence Theorems for Fixed Point Algorithms in the Class of Demicontractive Mappings

Vasile Berinde

Technical University of Cluj-Napoca, Cluj, Romania

vasile.berinde@mi.utcluj.ro

key-words: Hilbert space, demicontractive mapping, quasi-nonexpansive mapping, fixed point, Mann iteration.

Abstract:
We study some convergence theorems for Mann fixed point iterative algorithm used for approximating the fixed points of demicontractive mappings in Hilbert spaces and show that such kind of results could be derived from the corresponding convergence theorems in the class of quasi-nonexpansive mappings. Our derivation is based on the embedding of demicontractive mappings in the class of quasi-nonexpansive mappings by means of the averaged operator $T_\lambda = (1-\lambda)I + \lambda T$: if T is k-demicontractive, then for any $\lambda \in (0, 1-k)$, T_λ is quasi-nonexpansive. In this way we design a very simple and unifying technique of proof for various well known results in the iterative approximation of fixed points of demicontractive mappings, which are very important in optimization, digital image processing and machine learning. We illustrate this embedding technique for the case of two classical convergence results in the class of demicontractive mappings [1] and [2].The main results presented here are taken from the very recent paper [3].

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(β,γ)-Chebyshev Functions and Points of the Interval and Some Extensions

Stefano De Marchi[1], Giacomo Elefante[1] and Francesco Marchetti[1]

[1] Dipartimento di Matematica, University of Padova, Italy

stefano.demarchi@unipd.it, giacomo.elefante@unipd.it, francesco.marchetti@unipd.it

key-words: Chebyshev polynomials, Chebyshev points, Generalized Chebyshev points, Lebesgue constant.

Abstract:
We introduce the class of (β,γ)-Chebyshev functions and corresponding points, which can be seen as a family of *generalized* Chebyshev polynomials and points. For the (β,γ)-Chebyshev functions, we prove that they are orthogonal in certain subintervals of $[-1,1]$ with respect to a weighted arc-cosine measure. In particular we investigate the cases where they become polynomials, deriving new results concerning classical Chebyshev polynomials of first kind. Besides, we show that subsets of Chebyshev and Chebyshev-Lobatto points are instances of (β,γ)-Chebyshev points. We also study the behavior of the Lebesgue constants of the polynomial interpolant at these points on varying the parameters β and γ. We will then discuss their extension to the square $[-1,1]^2$ and higher-dimension.

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Verifying Approximation Estimates for Convolution Operators in Homogeneous Banach Spaces

Borislav R. Draganov

Department of Mathematics and Informatics, Sofia University "St. Kliment Ohridski", Sofia, Bulgaria
Institute of Mathematics and Informatics, Bulgarian Academy of Sciences, Sofia, Bulgaria

bdraganov@fmi.uni-sofia.bg

key-words: Convolution operator, singular integral, rate of convergence, degree of approximation, K-functional, saturation, homogeneous Banach space, Fourier transform.

Abstract:
We present a general method for establishing direct, strong converse, and Voronovskaya-type inequalities for convolution operators acting in homogeneous Banach spaces. These spaces are a natural generalization of the L_p-spaces with $1 \leq p < \infty$ and the spaces of uniformly continuous and bounded functions, defined in an Euclidean space or a multidimensional torus. The method is based on the behaviour of the Fourier transform of the kernel of the convolution operator and reduces the proof of the operator approximation properties, listed above, to establishing several functional equations. The direct and strong converse estimates are stated by means of a K-functional. The differential operator in the K-functional can be defined by the convolution operator similarly to the infinitesimal generator and described explicitly by means of the Fourier transform of its kernel. We also consider the phenomenon of saturation. The sufficient conditions this method is comprised of are quite natural and essentially necessary. We present a number of applications.

References

Discrete Time Reliability Systems and Some Optimization Problems

Serkan Erylmaz

Department of Industrial Engineering, Atilim University, Ankara, Türkiye.

serkan.eryilmaz@atilim.edu.tr

key-words: Age replacement, Coherent system, optimal configuration, reliability.

Abstract:
There are many engineering systems whose lifetimes are defined as the number of cycles until failure. Thus, discrete time reliability analysis plays important role to evaluate performance of such systems. Reliability engineering performs a wide variety of special management and engineering tasks such as optimal system design and development of appropriate reliability procedures. In this talk, some considerations will be shared with respect to a number of problems and challenges on discrete time systems from reliability engineering perspective. Several reliability optimization problems such as optimal replacement cycle and optimal number of redundancies will be mentioned.

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Certain Remarks on the Recent Publications on Metric Fixed Point Theory

Erdal Karapınar[1]

[1] Department of Mathematics, Cankaya University, Ankara, Türkiye

erdalkarapinar@gmail.com

Abstract:
The main aim of this talk is to indicate the dilemmas of the metric fixed point theory. First, we want to underline that almost all real-world problems are in the context of fixed point theorems. This observation reflects the fact that how metric fixed point theory can be helpful in a vast number of distinct disciplines. In other words, the metric fixed point theory has extensive application potential. On the other hand, several results or their equivalent forms were re-published due to ambitious authors' great interest in the metric fixed point theory. A substantial part of the new results suggested overlap with the current results. This talk aims to underline the difference between the novel and overlap results.

Large-Sample Properties of Jackknife. Estimators of the Variance of a Sample Quantile

Haikady N Nagaraja

The Ohio State University, U. S. A.

nagaraja.1@osu.edu

key-words: Order statistics, variance estimation, jackknife estimator, asymptotic theory.

Abstract:
We study for a finite $d(\geq 1)$, the limit properties of the family of delete-d jackknife estimators of the variance of a sample quantile from a random sample of size n as $n \to \infty$. We consider central and intermediate sample quantiles and for the central case, we provide asymptotically unbiased delete-d jackknife estimators of its large-sample variance. In the intermediate case, the limit distribution of the delete-d jackknife estimator is free of d. For the sample median, the limit distributions of the delete-d jackknife estimators of its variance differ for sequences of odd and even values of $n - d$.

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Semiparametric and Nonparametric Evaluation of First-Passage Distribution of Bivariate Degradation Processes

Tony Hon Keung Ng

Department of Mathematical Sciences, Bentley University, Waltham, Massachusetts, U. S. A.

tng@bentley.edu

key-words: cure-rate, optimization, cancer.

Abstract:
In system engineering, the reliability of a system depends on the reliability of each subsystem (or component) and those subsystems have their performance characteristics which can be dependent. The degradation of those dependent performance characteristics of the subsystems is used to assess the reliability of the system. Parametric frameworks have been developed to model bivariate and multivariate degradation processes in the literature; however, in practical situations, the underlying degradation process of a subsystem is usually unknown. In this work, we proposed different semiparametric and nonparametric methods to estimate the first passage time distribution of dependence bivariate degradation data. The saddlepoint approximation and bootstrap methods are used to estimate the marginal FPT distributions empirically and the empirical copula is used to estimate the joint distribution of two dependence degradation processes nonparametrically. A Monte Carlo simulation study and a numerical example are used to demonstrate the effectiveness and robustness of the proposed semiparametric and nonparametric approaches.
Collaborator: Dr. Lochana K. Palayangoda (Department of Mathematics, University of Nebraska Omaha)

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Functional Equations Related to Appell Polynomials and Heun Functions

Ioan Raşa[1] and Ana-Maria Acu[2]

[1] Department of Mathematics, Technical University of Cluj-Napoca, 28 Memorandumului Street, 400114 Cluj-Napoca, Romania
[2] Department of Mathematics and Informatics, Lucian Blaga University of Sibiu, Str. Dr. I. Ratiu, No. 5-7, 550012 Sibiu, Romania

ioan.Rasa[at]math.utcluj.ro, aria.acu@ulbsibiu.ro

key-words:

Abstract:
We are concerned with a functional equation related to equations satisfied by Legendre and Laguerre polynomials. Its solutions are expressed in terms of Appell polynomials. We identify families of log-convex functions and log-convex Heun functions. In this context an upper binomial transform is instrumental. The associated Appell polynomials are used in order to get results involving Jakimovski-Leviatan operators.

References

Almost Lacunary Strong $(\mathbf{A}, \varphi)$- convergence of Order α

Ekrem Savaş

Department of Mathematics, Uşak University, Uşak, Türkiye

ekremsavas@yahoo.com

key-words: Modulus function, almost convergence, lacunary sequence, φ-function order α

Abstract:
Let w denote the set of all real and complex sequences $x = (x_k)$. By l_∞ and c, we denote the Banach spaces of bounded and convergent sequences $x = (x_k)$ normed by $\|x\| = \sup_n |x_n|$, respectively. In summability theory, the concept of almost convergence was first introduced by G.G. Lorentz in 1948. Let us observe the outline of it. A linear functional L on l_∞ is said to be a Banach limit [1] if it has the following properties:

1. $L(x) \geq 0$ if $n \geq 0$ (i.e. $x_n \geq 0$ for all n),
2. $L(e) = 1$ where $e = (1, 1, \ldots)$,
3. $L(Dx) = L(x)$, where the shift operator D is defined by $D(x_n) = \{x_{n+1}\}$.

Let B be the set of all Banach limits on l_∞. A sequence $x \in \ell_\infty$ is said to be almost convergent if all Banach limits of x coincide. Let $\hat{c}$ denote the space of almost convergent sequences . Lorentz [**?**] has shown that

$$\hat{c} = \left\{ x \in l_\infty : \lim_m t_{m,n}(x) \text{ exists uniformly in } n \right\}$$

where

$$t_{m,n}(x) = \frac{x_n + x_{n+1} + x_{n+2} + \cdots + x_{n+m}}{m+1}.$$

By a lacunary $\theta = (k_r)$; $r = 0, 1, 2, ...$ where $k_0 = 0$, we shall mean an increasing sequence of non-negative integers with $k_r - k_{r-1} \to \infty$ as $r \to \infty$. The intervals determined by θ will be denoted by $I_r = (k_{r-1}, k_r]$ and $h_r = k_r - k_{r-1}$. The ratio $\frac{k_r}{k_{r-1}}$ will be denoted by q_r. The space of lacunary strongly convergent sequences N_θ was defined by Freedman at al [2] as follows:

$$N_\theta = \left\{ x = (x_k) : \lim_r \frac{1}{h_r} \sum_{k \in I_r} |x_k - L|) = 0, \text{ for some } L \right\}.$$

In this paper we present some new almost strong sequence spaces of order α that are defined using the real matrix A and also we examine some properties of those sequence spaces.

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A Galerkin Approach to the Solution of Anisotropic Kirchhoff-type Problems with Convection Term

Calogero Vetro

Department of Mathematics and Computer Science, University of Palermo, Palermo, Italy

calogero.vetro@unipa.it

key-words: p-Laplace differential operator, Galerkin method, Gradient dependent problem, Kirchhoff weight, weak solution.

Abstract:
We consider boundary value problems driven by the anisotropic p-Laplace differential operator, as well as by the anisotropic (p, q)-Laplace differential operator, and a reaction exhibiting gradient dependence (convection). The problems have both an anisotropic setting due to the variable exponents of the main operators and a degeneracy feature due to the sign-changing Kirchhoff weights. Since the presence of the gradient in the reaction inhibits the development of a variational approach in dealing with the qualitative study of these problems, then our approach is based on the so-called Galerkin method. According to this approach, we obtain a discretization of the anisotropic solution space using its Galerkin basis and in this way we can solve a continuous problem by originating an appropriate sequence of auxiliary discrete finite-dimensional problems. We impose certain technical conditions to control the growth of the reaction terms, obtaining suitable a priori estimates together with sign constraints. Using the theory of pseudomonotone operators and fixed point arguments, the main results establish that the bounded value problems have nontrivial weak solutions.

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A Mathematical Model for the Study of Vascular Patologies

Gianluca Vinti

Department of Mathematics and Computer Science, University of Perugia, Perugia, Italy

gianluca.vinti@unipg.it

key-words: Approximation by sampling Kantorovich operators, digital image processing algorithms, computer tomography.

Abstract:
I will present a mathematical model based on the study of some sampling type operators whose approximation results lead to applications to the reconstruction and the enhancement of digital images ([1, 2]). These, in turn, will allow to solve a diagnostic problem, concerning vascular pathologies, studied within the CARE project ([3]).

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ORAL PRESENTATIONS

Some Results for f-minimal Hypersurfaces in Manifolds with Density

Mohammed Abdelmalek

Ecole Supèrieure de Management de Tlemcen, Tlemcen, Algeria

abdelmalekmhd@gmail.fr

Abstract:
In this work, we study the hypersurfaces of constant weighted mean curvature embedded in weighted manifolds. We give a condition about these hypersurfaces to be minimal. This condition is given by the ellipticity of the weighted Newton transformations T_r^∞. We give in the end some examples and applications.

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Relaxation of an Evolution Problem Involving Time-dependent Maximal Monotone Operators

Nadjiba Abdi[1] and Soumia Saidi[1],

[1] Department Mathematics, Mohammed Seddik Benyahia University, Jijel, Algeria

soumiasaidi44@gmail.com, nadjibaabdi@gmail.com.

key-words: Differential inclusion, maximal monotone operator, relaxation

Abstract:
We are inspired in the present work by the contributions in [1], [2], [3], concerning relaxation of evolution inclusions driven by subdifferentials or time-dependent maximal monotone operators.

We consider a control system governed by time-dependant maximal monotone operators, and the relaxed problem with integrand convexified in control. Then, we deduce the relationship between the two. The investigation of these problems holds in the context of a real separable Hilbert space.

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A New Approach to Fixed Point Theory via Integral Type Mappings on Orthogonal Metric Space

Özlem Acar

Department of Mathematics, Selçuk University, Konya, Türkiye

acarozlem@ymail.com

key-words: Fixed point, integral type mapping, orthogonal metric space.

Abstract:
The study of fixed point theorems of mappings satisfying contractive conditions of integral type has been a very interesting field of research activity after the establishment of a theorem by A. Branciari [1] He appointed good integral prescription of the Banach contraction principle. Since then, many authors have established fixed point theorems for several classes of contractive mappings of integral type ([2, 5, 6]). Especially Liu et. al. [7] extended the result of Brianciari in many different ways. Recently, for the first time, Gordji et al. [3] expand the literature on metric space by introduced the concept of orthogonality, established the fixed point result. There are several uses for this novel idea of an orthogonal set, as well as numerous forms of orthogonality. Further for more information, we refers the reader to ([4, 8, 9]). This study is devoted to investigate the problem whether the existence and uniqueness of integral type contraction mappings on orthogonal metric space.

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Pointwise Convergence Results for Exponential Sampling Durrmeyer Operators

Tuncer Acar

Department of Mathematics, Selçuk University, Selçuklu, Türkiye

tunceracar@ymail.com

key-words: Durrmeyer form of exponential sampling series, logarithmic weighted spaces, logarithmic modulus of continuity, a quantitative form of Voronovskaja type theorem.

Abstract:
In this paper, we present a quantitative Voronovskaya type theorem for exponential sampling Durrmeyer operators in logarithmic weighted space of functions in terms of weighted logarithmic modulus of continuity. Such a result allows us to determine a rate of pointwise convergence of the family of exponential sampling Durrmeyer operators and an upper bound for the error of this convergence.

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Lipschitz Operator Ideals

Dahmane Achour

Department of mathematics, University of M'sila, Laboratory of Functional Analysis and Geometry of Spaces, Box: 166, Ichbilia, M'sila, 28000, Algeria

dahmane.achour@univ-msila.dz

key-words: Lipschitz operator ideal, Lipschitz compact mapping, Lipschitz classical p-compact operator, Lipschitz weakly p-nuclear operator.

Abstract:
In 2009 Farmer and Johnson introduce the Lipschitz p-summing operator ideals between Banach spaces. This work motivated many authors to study different classes of Lipschitz functions that extend, in some sense, linear operators ideals, leading to the recent notion of Banach Lipschitz operator ideals. In this talk we will give the basics of the theory of Banach Lipschitz operator ideals and how it relates with the theory of Banach operator ideal. Also, we will give a (brief) discuss about how it can or can't be related to nonlinear geometry of Banach spaces.

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On a Class of Sequential Fractional Differential Equations with Infinite Delay

Rabah Khaldi[1], Ahlem Adoui[1] and Assia Guezane-Lakoud[1]

[1] Department of Mathematics, University of Badji Mokhtar-Annaba, Annaba, Algeria

rkhadi@yahoo.fr, adouiahlem13@gmail.com, a_guezane@yahoo.fr

key-words: Sequential Riemann-Liouville fractional derivative, initial value problem, infinite delay.

Abstract:
The initial value problem (IVP) for the Riemann-Liouville nonlinear fractional differential equation is studied in [1]. The analysis of fractional sequential [3] initial value problems is still not sufficiently enriched. Many recent works are devoted to sequential fractional differential equations involving Caputo and Riemann-Liouville or Hadamard derivatives. In this paper we address the nonlinear Riemann-Liouville sequential IVP with infinite delay based on [1],[2],[3]. We give sufficient conditions for existence and uniqueness results. Proofs are carried out employing fixed point theory.

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$\gamma - b - I$ Connectedness

Hürmet Fulya Akız

Mathematics Department, Yozgat Bozok University, Yozgat, Turkey

fulya.gencel@yobu.edu.tr

key-words: Ideal topological space, generalized open sets, γ operation.

Abstract:
In [1], Kasahara defined an operation $\gamma\colon \tau \to P(X)$ as a function from τ to the power set of $P(X)$ such that $V \subseteq V^{\gamma}$, for each $V \in \tau$, where V^{γ} denotes the value of γ at V. In [2], Hussain introduced generalized open sets namely $\gamma - b$-open sets in topological spaces. On the other hand, in 1966, Kuratowski [3] studied and applied the concept of ideals. An ideal I on a topological space (X, τ) is a collection of subsets of X having the heredity property (i) if $A \in I$ and $B \subset A$, then $B \in I$ and (ii) if $A \in I$ and $B \in I$, then $A \cup B \in I$. The definition of $\gamma - b - I$ open sets in ideal topological spaces is given in [3]. In this study, we introduce and explore $\gamma - b - I$ connectedness by using $\gamma - b - I$ open sets in ideal topological spaces.

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Weak Projective Modules

Yusuf Alagöz

Department of Mathematics, Siirt University, Siirt, Turkey

yusuf.alagoz@siirt.edu.tr

key-words: Weak injective modules, weak flat modules, weak projective modules.

Abstract:
Some new studies in homological algebra have focused on to generalize some results of a homological nature from coherent rings to arbitrary rings. Accordingly, the concepts of weak injective and weak flat modules in terms of super finitely presented modules aroused interest and many results on them and their generalizations have been appeared in the litarature, see for example ([2, 4, 5, 6]). Namely, a left R-module M is called weak injective if $Ext^1_R(F, M) = 0$ for any super finitely presented left R-module F. A right R-module N is called weak flat if $Tor^R_1(N, F) = 0$ for any super finitely presented left R-module F (see [4]).

In this talk, inspired by the papers [1, 3], we will introduce the left orthogonal class of weak flat right modules to present some new results about the weak flat and weak injective modules. These concepts are used to extend the some known results and to give some new characterizations of rings. As applications, using homological dimensions of aforementioned modules, new characterizations of coherent rings, perfect rings, quasi-Frobenius rings and von Neumann regular rings are given.

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Characteristic Properties of Scattering Data for a Schrödinger Equations with Discontinuities in an Interior Point

Khanlar Mamedov[1] and Shebnur Alizadeh[2]

[1] Department of Mathematics, Igdir University, Igdir, Türkiye
[2] Department of Mathematics and Informatics, Lankaran State University, Lankaran, Azerbaijan

residoglu@igdir.edu.az, shabnuralizade@gmail.com
key-words: Scattering data, Schrödinger equation, characteristic properties.

Abstract:
Consider the boundary value problem generated by the differential equation

$$-u'' + q(x)u = \lambda^2 u, \tag{1}$$

the boundary condition

$$-u'(0) + (a_1 + a_2\lambda^2)u(0) = 0, \tag{2}$$

on the half line $[0, \infty)$, with the transmission conditions

$$\begin{aligned} u(x_0 - 0) &= \gamma u(x_0 + a) \\ u'(x_0 - 0) &= \gamma^{-1} u(x_0 + a)' \end{aligned} \tag{3}$$

where λ is a complex parameter, $q(x)$ is a real valued function satisfying the condition

$$\int_0^\infty (1 + x)|q(x)|dx < \infty. \tag{4}$$

The characteristic properties of the boundary value problem 11–4 in the case $a_2 = \gamma = 0$ was examined in [1, 2].

In this paper, we defin the scattering data of the boundary value problem 11–4 and these characteristic properties of the scattering data are investigated. Similar problem in the case $\gamma = 0$ was studied in [3].

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Weighted Pointwise Convergence of Some Multidimensional Nonlinear Integral Operators at μ-p-point

Sevgi Esen Almalı

Department of Mathematics, Science and Art Faculty, Kırıkkale Universtiy

sevgiesen@kku.edu.tr

key-words: Weighted pointwise convergence, μ - p -generalized Lebesgue point, multidimensional singular integral operators.

Abstract:
This paper is researched weighted pointwise convergence by nonlinear multidimensional singular integral operators at a common μ - p -generalized Lebesgue point of the functions f$\in$ $L_{p,\phi}$ (R^n). In here ϕ is that ϕ : $R^n \rightarrow R^+$ is a suitable weight function and $L_{p,\phi}(R^n)$, (1$\leq$ $p < \infty$) is the space all measurable functions for which $\left|\frac{f}{\phi}\right|$ is integrable on R^n. This work is organized as follows: In Section 1, we introduce the fundamental definitions in Section 2, we prove the existence of the operators . In Section 3, we prove a theorem concerning weighted pointwise convergence of the operators.

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An Introduction to Nonlinear Baskakov-Durrmeyer Operators with its Approximation Properties

Huseyin Erhan Altin

Department of Mathematics, Bolu Abant Izzet Baysal University, Bolu, Türkiye

erhanaltin@ibu.edu.tr

key-words: Nonlinear operators, bounded variation, pointwise convergence.

Abstract:
Approximation theory is one of the most popular area for mathematical research with its extensive potential for applications. With Korovkin's well-known theorem running with the linear positive operators became productive part of approximation theory. Thuswise, the well-liked operators as Bernstein, Szász, Baskakov and their various generalizations have been studied intensively.
The approximation of nonlinear operators was not popular before the fundamental paper of the famous Polish mathematician Julian Musielak [1]. In view of the idea introduced in [1] and substantially developed in [2], the approximation theory extended to the nonlinear operators with some especial assumptions on their kernel functions. Some convergence results for nonlinear Durrmeyer type operators and nonlinear Bernstein type operators on functions of bounded variation can be found in [3], [4].
The present study concerns with the introduction a sequence of nonlinear Baskakov-Durrmeyer operators (NB_n) of the form

$$(NB_n)(f;x) = \int_0^\infty K_n(x,t,f(t))dt, \quad x \in [0,\infty), \quad n \in \mathbb{N} \tag{5}$$

acting on bounded functions on every finite subinterval of $[0,\infty)$ where $K_n(x,t,u)$ satisfy some suitable assumptions. We will also investigate the pointwise convergence of this operators in some functional spaces. They are dealing with the rate of pointwise convergence of the nonlinear Baskakov-Durrmeyer operators NB_n for functions of bounded variation on every finite subinterval of $[0,\infty)$. This work can be considered as a continuation of the author's studies about nonlinear operators and their convergence. As far as we know this kind of study is the first one on the nonlinear Baskakov-Durrmeyer operators.

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Local Approximation Problems and Korovkin-type Theorems

Francesco Altomare

Department of Mathematics, University of Bari, Bari, Italy

francesco.altomare@uniba.it

key-words: Positive linear operator, Korovkin-type theorem, local uniform approximation, bounded $2\pi-$ periodic function, Bernstein-type operator, convolution operator.

Abstract:
The talk will be centered about some very recent results which are documented in [1].

Of concern are local approximation problems for sequences of positive linear operators acting on linear subspaces of functions defined on a metric space.

A Korovkin - type theorem is established in such a framework together with several consequences related to one dimensional, multidimensional and infinite dimensional settings (Hilbert spaces).

This theorem extends a result due to Korovkin ([2, Theorem 3, p.14]) which seems has not been equally emphasized in the subsequent literature as the classical renowned Korovkin theorem.

Some applications will be discussed which concern classical sequences of positive linear operators including (one dimensional and multidimensional) Bernstein operators, Kantorovich operators, Szász - Mirakyan operators, Gauss - Weierstrass operators and Bernstein - Schnabl operators on convex subsets of Hilbert spaces.

The final part of the talk will be devoted to discuss a reassessment of a further result of Korovkin in the framework of subspaces of bounded $2\pi-$ periodic functions on $\mathbb{R}$. Some applications related to sequences of convolution operators generated by positive approximate identities will be showed as well.

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Public-key Authentication Schemes Based on the Hidden Discrete Logarithm Problem

Hasan Arslan[1], Alnour Altoum[1] and Hüseyin Altındiş [1]

[1] Faculty of Sciences, Department of Mathematics, Erciyes University, Kayseri, Türkiye

hasanarslan@erciyes.edu.tr, alnouraltoum178@gmail.com, altindis@erciyes.edu.tr

key-words: Public-key authentication, coxeter group, Hidden discrete logarithm problem.

Abstract:
This paper introduce two authentication schemes based on the interactability of the hidden discrete logarithm problem (HDLP). We will prove that these schemes are being zero-knowledge interactive proofs of knowledge. The security of the authentication schemes relies on the hardness of HDLP over automorphism group of a finite Coxeter group. Moreover, the proposed schemes are a candidate to be resist the ordinary and quantum computers.

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On the Modification of Baskakov-Kantorovich Type Operators Preserving Exponential Functions

Ali Aral[1], Fırat Özsaraç[1], Vijay Gupta[2]

[1] Department of Mathematics, Kırıkkale University, Kırıkkale, Türkiye
[2] Department of Mathematics, Netaji Subhas University of Technology, New Delhi, India

aliaral73@yahoo.com, firat_ozsarac@hotmail.com, vijaygupta2001@hotmail.com

key-words: Baskakov-Kantorovich type operators, exponential functions, order of convergence.

Abstract:
In this presentation, we give the studies for modified Baskakov-Kantorovich operators preserving exponential functions. Firstly, we express exponential moments. Later, a Voronovskaya-type theorem and a quantitative-type theorem are stated.

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On Deferred Harmonic Summability of Order α

Nazlım Deniz Aral[1], Hacer Şengül Kandemir[2] and Mikail Et[3]

[1] Department of Mathematics, Bitlis Eren University/ Bitlis, TURKEY
[2] Faculty of Education, Harran University/Osmanbey Campus 63190, Şanlıurfa, TURKEY
[3] Department of Mathematics, Firat University/23119, Elazığ, TURKEY

ndaral@beu.edu.tr, hacer.sengul@hotmail.com, mikailet68@gmail.com

key-words: Deferred statistical convergence, harmonic convergence, summability of sequences.

Abstract:
In 1932, R.P. Agnew [1] defined the deferred Cesaro mean $D_{p,q}$ of the sequence $x = (x_k)$ by

$$(D_{p,q}x)_n = \frac{1}{q(n) - p(n)} \sum_{p(n)+1}^{q(n)} x_k$$

where $\{p(n)\}$ and $\{q(n)\}$ are sequences of non-negative integers satisfying

$$p(n) < q(n) \text{ and } \lim_{n\to\infty} q(n) = +\infty. \tag{6}$$

In this study, the concepts of deferred $(D,1)-$ summability, deferred strongly harmonically summability of order, deferred statistical logarithmic convergence of order of sequences of real numbers are introduced and relations between these concepts are investigated.

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New Results on Timelike Mannheim Curves in Minkowski 3-Space

Halil brahim Arıcı[1], Kazm larslan[1]

[1]Department of Mathematics, Krkkale University, Krkkale, Türkiye

halilibrahimarici@gmail.com, kilarslan@yahoo.com

key-words: Mannheim curves, timelike curves, Minkowski 3-space.

Abstract:
In the theory of curves in Euclidean 3-space, it is well known that a curve $\beta : I \to \mathbb{E}^3$ with non-zero curvatures is said to be a Mannheim curve if there is a curve $\beta^\star : I^\star \to \mathbb{E}^3$ such that the principal normal vectors of $\beta(s)$ coincide with the binormal vectors of $\beta^\star(s^\star)$ at $s \in I$, $s^* \in I^*$. These curve have been studied in different space over a long period of time and found wide application in different areas. Therefore, we have a great knowledge of the geometric properties of these curves. In [1], Mannheim partner curves were studied 3-dimensional space. This point of view was also carried to curves in Minkowski 3-space [2, 4]. In [5] ,the authours gave a new approach to Mannheim curves. In [6], the authours gave a new approach to Mannheim curves in Minkowski 3-space. Thanks to this new approach, new Mannheim curve examples, which are not known in the literature, are obtained and new results are given. In this talk, timelike Mannheim curves are reconsidered from the perspective of this new approach. The new results obtained were supported with examples.

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On Establishing Empirical Realitonship Between Global Crude Oil Market and the Nigerian Stock Exchange Using Vector Autoregressive Model

Kalu Chukwuemeka Arua[1], Nduka Uchenna Chinedu[1]

[1] Department of Statistics, University of Nigeria, Nsukka, Nigeria

chukwuemeka.kalu.251972@unn.edu.ng,
key-words: Crude oil price, all share index, vector autoregressive model, stock exchange, consumer price index, variance decomposition, impulse response, granger causality.

Abstract:
This research work is purposed to undercover the empirical relationship residing in-between the global crude oil market and Nigerian stock exchange from 1997 to 2019. Variables chosen for this study are crude oil price, crude oil export, crude oil production, all share index, consumer price index and exchange rate and were analyzed using the model. The results from our analyses show that firstly, the global crude oil market has a positive correlation with the Nigerian stock exchange. That implies that as the values of the global crude oil market rises (falls), the values of the Nigerian stock exchange also rises (falls). Secondly, the Granger Causality test confirmed that the consumer price index is helpful in forecasting the future values of exchange rate. Furthermore, the variance decomposition and impulse response revealed that to stabilize the value of all share index, we literally optimize the exchange rate by encouraging mechanized farming to boost the export of cash crops, encouraging and enhancing our local firms and diversification of the Nigerian economy.

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Deferred Statistical Boundedness of Order α On Time Scale

Mikail Et[1], Koray brahim Atabey[2], Erdal Korkmaz[3] and Muhammed Çınar[4]

[1] Department of Mathematics, Frat University, Elaz, Türkiye
[2] Nizamulmülk Kiz Anadolu Imam Hatip High School, Mu, Türkiye
[3] Department of Mathematics, Mu Alparslan University, Mu, Türkiye
[4] Department of Mathematics Education, Mu Alparslan University, Mu, Türkiye

mikailet68@gmail.com, korayatabey7@gmail.com, e.korkmaz@alparslan.edu.tr, muhammedcinar23@gmail.com

key-words: Statistical convergence, statistical boundedness, time scales.

Abstract:
In this paper, we introduce the concept of statistical boundedness of order α of $\Delta-$measurable real-valued functions on an arbitrary time scale. There are adding several theorems that relate deferred statistical convergence and deferred statistical boundedness of order α on time scales. We also give the relations between statistical boundedness and statistical boundedness of order α on time scales.

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σ-Derivations on Operators Algebras

Mehsin Jabel Atteya

Department of Mathematics, College of Education, Al-Mustansiriyah University, Baghdad, Iraq
mehsinatteya@yahoo.com

key-words: σ-Derivation, prime ring, zero commutative ring.

Abstract:
In 2002, Lu and Li proved the following result [2]. Let B be a standard operator algebra in a Banach space X containing the identity operator I and let $\delta\colon B \to B$ be a linear map such that $\delta(AB) = \delta(A)B + A\delta(B)$ for any pair $A, B \in B$ with $AB = 0$. Then $\delta(AB) = \delta(A)B + A\delta(B) - A\delta(I)B$ for all $A, B \in B$. If in addition $\delta(I) = 0$, then δ is a derivation. In other words, the result says that an additive map on a standard operator algebra is almost a derivation if it satisfies the expansion formula of derivations on pairs of elements with zero product. Since standard operator algebras involve many idempotents, from this point of view Chebotar, Ke and P.-H.Lee studied maps acting on zero products in the context of prime rings [1]. Tsiu-Kwen Lee [3] posted, let A be a prime ring whose symmetric Martindale quotient ring contains a nontrivial idempotent. Generalized skew derivations of A are characterized by acting on zero products. Precisely, if $g, \delta\colon A \to A$ are additive maps such that $\sigma(x)g(y) + \delta(x)y = 0$ for all $x, y \in A$ with $xy = 0$, where σ is an automorphism of A, then both g and δ are characterized as specific generalized σ-derivations on a non-zero ideal of A.
In this paper we will generalize the results of Tsiu.-K wen Lee [3] from a different point of view. We will study this subject without the condition that maps acting on zero products via using zero commutative ring. An additive map $d\colon R \to R$ is called a derivation if the Leibniz's rule $d(xy) = d(x)y + xd(y)$ holds for all $x, y \in R$. Also, let σ be an automorphism of a prime ring A. An additive map $\delta\colon A \to Q_{ml}$ is called a σ-derivation if $\delta(xy) = \sigma(x)\delta(y) + \delta(x)y$ for all $x, y \in A$. Furthermore, a ring R is called zero commutative if for $a, b \in R, ab = 0$ implies $ba = 0$ (used the term reversible for what is called zero commutative).
Theorem: Let R be a zero commutative prime ring with extended Z and $z \in R$. Suppose that R possesses a nontrivial idempotent and $\kappa\colon R \to R$ is an additive map such that $x\kappa(y) + \kappa(x)y + xzy = 0$ for all $x, y \in R$ and κ acts as a left centralizer of R, then there exist a derivation $d\colon R \to RZ$ and $m \in Z$ such that $\kappa(x) = d(x) + (m - z)x$ for all $x \in R$.
Theorem: Let R be a zero commutative prime ring with extended Z and $z \in R$. Suppose that its symmetric Martindale quotient ring Q contains a nontrivial idempotent. If d and g are two operators of R satisfying $xd(y) + g(x)y = 0$ for all $x, y \in R$ then there exist $a, b, q \in RZ$ such that $ax = xb$, where g (resp. d) acts as a centralizer map of R.

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Exponential Zagreb Indices of Graphs

Nihat Akgüneş[1], Büşra Aydın[1]

[1] Department of Mathematics-Computer Sciences, Necmettin Erbakan University, Konya, Türkiye

nakgunes@erbakan.edu.tr, bsrcgn@gmail.com

key-words: Exponential index, graph, topological index, Zagreb index.

Abstract:
The exponential topological indices have been recently introduced to the literature. In this study, it is investigated that exponential Zagreb indices of special graphs. Then some new bounds on unicyclic, acyclic, and general graphs are obtained.

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Robust Calibration Estimation of Population Mean in Stratified Sampling in the Presence of Outlier

Oluwagbenga Tobi Babatunde[1], Abimibola Victoria Oladugba[1]

[1] Department of Statistics, University of Nigeria, Nsukka, Nigeria

oluwagbenga.babatunde@unn.edu.ng, abimibola.oladugba@unn.edu.ng

key-words: Calibration estimation, Stratified sampling, outlier, median, robust.

Abstract:
A new improved calibration estimator for the population mean in a stratified sampling in the presence of an outlier in the auxiliary variable was proposed in this paper. The median of the auxiliary variable was used in defining the calibration constraints. Simulation study as well as empirical study were performed to establish the performance of the proposed estimator over some existing estimators. The results of both simulation and empirical studies show that the proposed calibration estimator performed better and more efficient to all the existing calibration estimators in this work.

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Exponentiated New Modified Weighted Rayleigh Distribution with Application

N. I. Badmus[1] and O. Faweya[2]

[1] Department of Statistics, University of Lagos, Akoka, Lagos, Nigeria
[2] Department of Statistics, Ekiti State University, Ekiti, Nigeria

nibadmus@unilag.edu.ng, lanrefaweya@gmail.com

key-words: Flexibility, modified Exponentiated, rayleigh, weibull, weighted

Abstract:
A three-parameter modified exponentiated new weighted Rayleigh distribution has been proposed from existing exponentiated new weighted Weibull distribution introduced by Elsherpieny et al. (2017). The modification was done by replacing one of the parameters of the existing distribution with two to gain the modified distribution. Several statistical properties of the target distribution are derived and discussed. We apply a real life data set to illustrate the flexibility and potentiality of the distribution and the result reveals that the proposed distribution is better than other known and new distributions considered for the study.

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Construction of Bivariate Modified Bernstein-Chlodowsky Operators and Approximation Theorems

Sevda Yıldız[1], Nilay Şahin Bayram[2]

[1] Department of Mathematics, Sinop University, Sinop, Turkey
[2] Department of Electrical and Electronics Engineering, Faculty of Engineering, Başkent University, Ankara, Turkey

sevdaorhan@sinop.edu.tr, nsbayram@baskent.edu.tr

key-words: Bernstein-Chlodowsky Polynomials, Korovkin Type Theorems, Power Series Method, Double sequences.

Abstract:
There are many studies about the Bernstein-Chlodowsky operators in the literature. On the other hand we know only a few papers that are devoted to the two-dimensional case. In this paper we modified Bernstein-Chlodowsky operators via weaker condition the classical Bernstein-Chlodowsky operators condition. We get more powerful results than classical ones. Then we prove the Korovkin type approximation theorem. As it is well-known Korovkin opened a new way to approximation theory by the test functions. Furthermore, we analyze the theoretical results and we give some concluding remarks.

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Using Reproducing Kernel for Solving Third-Order Boundary Value Problems

Bendjazia Nassima[1], Guezane-Lakoud[2]

[1] Department of Mathematics,University 08 Mai 45/Guelma, Algeria
[2] Department of Mathematics, Badji Mokhtar-Annaba University, Annaba, Algeria

nassimarihem@yahoo.fr
key-words: Reproducing kernel method, exact solution, approximate solution.

Abstract:
We consider a boundary-value problem for the third-order differential equation

$$U_{xxx}(x,t) - U_{tt}(x,t) + \delta U(x,t) = F(x,t), \quad (x,t) \in Q = (0,1) \times (0,1)\,,\ \delta > 0 \tag{7}$$

subject to the boundary conditions:

$$U(0,t) = \varphi(t)\,, U(1,t) = \psi(t)\,, U_x(1,t) = \xi(t)\,, \quad U_t(x,0) = U_t(x,1) = 0 \tag{8}$$

Using the reproducing kernel Hilbert space method, we find the approximate solution of the boundary value problem, The exact solution is expressed in form of series. The convergence of the iterative method to find the approximate solution is proven. Some numerical examples are studied to demonstrate the accuracy of the present method. Results obtained by the method are compared with the exact solution of each example which are found to be in good agreement with each other.

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Numerical Solution of Linear Equations of the Second Kind and Associated Inverse Problems

M. I. Berenguer[1], M. Ruiz-Galán[1]

[1] Department of Applied Mathematics and Institute of Mathematics (IMAG), Escuela Técnica Superior de Ingeniería de Edificación, University of Granada, Granada, Spain

maribel@ugr.es, mruizg@ugr.es

key-words: Linear equations of the second kind, numerical solution, inverse problem.

Abstract:
In the first part of this talk, we obtain a method for iteratively approximating the solution of a linear equation of the second kind in a Banach space. This algorithm is based on a generalized perturbed version of the geometric series theorem and the error control that this provides. Some numerical examples in order to illustrate the behavior of the proposed method are presented. The second part deals with an inverse problem related to second kind equations and it relies on the a generalized perturbed version of the Collage theorem in a linear framework.

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New Results About Lebesgue-type Parameters in Greedy Approximation Theory

Pablo M. Berná

Departmento de Métodos Cuantitativos, CUNEF Universidad

pablo.berna@cunef.edu

key-words: Almost-greedy bases, greedy algorithm.

Abstract:
In 1999, S. V. Konyagin and V. N. Temlyakov introduced the so called Thresholding Greedy Algorithm $(\mathcal{G}_m)_{m=1}^{\infty}$ (TGA for short). Basically, given a basis $\mathcal{B}$ in a Banach space X and $f \in X$, the algorithm selects the largest coefficients of f respect to the basis. One of the topics in this area is devoted to study the Lebesgue-type parameter $(\mathbf{L}_m)_{m=1}^{\infty}$ for the TGA: for each natural number m, $\mathbf{L}_m$ is the smallest constant C such that

$$\|f - \mathcal{G}_m(f)\| \leq C\sigma_m(f),\ \forall f \in X,$$

where $\sigma_m(f)$ is the best mth error in approximation. Several researchers have studied asymptotic bounds for $\mathbf{L}_m$. In [1], we quantify the size of $\mathbf{L}_m$ in terms of a new generation of parameters that modulate accurately some features of a general basis. Our study gives the answer of a question raised by Temlyakov in 2011 to find a natural sequence of greedy-type parameters for arbitrary bases in Banach (or quasi-Banach) spaces which combined linearly with the sequence of unconditionality parameters determines the growth of $\mathbf{L}_m$. In that talk, we give a general review of the history of these parameters and we conclude with the new optimal results.

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Some Results on Sasakian Manifolds with Non-Symmetric Non-Metric Connection

Selahattin Beyendi

Faculty of Education, Inonu University, Malatya, Türkiye.

selahattin.beyendi@inonu.edu.tr

key-words: Sasakian manifold, non-symmetric non-metric connection, Einstein manifold, η-Einstein manifold.

Abstract:
In this work, we study some results on Sasakian manifolds admitting the non-symmetric non-metric connection. In this respect, we have studied Sasakian manifolds on pseudo-projectively flat, ξ-pseudo-projectively flat, φ-pseudo-projectively semi-symmetric, W_8 flat, $\varphi - W_8$ semi-symmetric conditions admitting the non-symmetric non-metric connection.

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A Unified Generalized Process Capability Index for Logistic-exponential Distribution

Amartya Bhattacharya[1], Mahendra Saha[2], Sukanta Pramanik[3], Sudhansu S. Maiti[4] and Arindam Gupta[5]

[1] National Atlas and Thematic Mapping Organisation(NATMO), Government of India, Kolkata, India
[2] Department of Statistics, Central University of Rajasthan, Ajmer, India
[3] Department of Statistics, Siliguri College, Siliguri, India
[4] Department of Statistics, Visva-Bharati University, Santiniketan, India
[5] Department of Statistics, The University of Burdwan, Burdwan, India

amartya1991@gmail.com, mahendrasaha@curaj.ac.in, skantapramanik@gmail.com, sudhansu.maiti@gmail.com, guptaarin@gmail.com

key-words: Bootstrap confidence intervals, classical methods of estimation, logistic exponential distribution, Monte-Carlo simulation.

Abstract:
The process capability index is an effective tool in industries for assessment of process performance and for measuring how much the product meets the costumer expectations. In our study, new unified measure of generalized process capability index, namely unified generalized process capability index (UGPCI) $C_{py}(u, v)$ for the logistic-exponential underlying distribution [1] has been developed. Method of maximum likelihood, method of least square, method of weighted least square, method of percentile, method of Cramèr-von-Mises and method of maximum product of spacings are taken into consideration for analysis purpose. The performances of the classical estimation methods in terms of their respective biases and mean squared errors are analyzed by simulation study. A comparative study has been made to compare the performances of the bootstrap confidence intervals [2], viz., standard bootstrap, percentile bootstrap and bias-corrected percentile bootstrap of UGPCI $C_{py}(u, v)$ in terms of average widths and coverage probabilities.Two data sets are analyzed to show the acceptance of the proposed methods.

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Conformal Vector Fields and Geometric Solitons on the Tangent Bundle with the Ciconia Metric

Aydın Gezer[1], Lokman Bilen[2]

[1] Department of Mathematics, Ataturk University, Erzurum, Türkiye
[2] Department of Mathematics, Iğdır University, Iğdır, Türkiye

aydingzr@gmail.com, lokman.bilen@igdir.edu.tr.

key-words: Tangent bundle, ciconia metric, conformal vector field, almost Ricci and Yamabe solitons.

Abstract:
Let (X_{2k}, γ, g) be an almost anti-paraHermitian manifold with an almost paracomplex structure γ and a Riemannian metric g and let TX be its tangent bundle with the ciconia metric $\tilde{g}$. The purpose of this paper is two folds. The first is to examine the curvature properties of the tangent bundle TX with the ciconia metric $\tilde{g}$. The second is to study conformal vector fields and almost Ricci and Yamabe solitons on the tangent bundle TX according to the ciconia metric $\tilde{g}$.

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Composition Operators on the Homogeneous Besov-type Spaces

Gheribi Bochra

Laboratory of Functional Analysis and Geometry of Spaces, Mohamed Boudiaf University/ M'Sila, 28000 M'Sila, Algeria

bochra.gheribi@univ-msila.dz.

key-words: Besov-type spaces, Littlewood-Paley decomposition, composition operator.

Abstract:

Over 45 years, Many authors treated the problem of composition in a real-valued function spaces see.e.g., [1], [2] and [3], and it still until now opened problems in this line of research, they give a necessary conditions on a function $f : R \mapsto R$ where f is the associated composition operator, i.e., mappings $T_f(g) := f \circ g$ with g in function space E, to show that f acts in E by composition i.e., T_f takes E into itself ($T_f(E) \subset E$).

In the present work we propose to study this problem in the homogeneous Besov-type spaces $\dot{B}^{s,\tau}_{p,q}(R^n)$, here we want to extend the result given in [4].

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Bivariate Baskakov Operators Preserving Exponential Functions

Murat Bodur

Department of Engineering Basic Sciences, Konya Technical University, Konya, Türkiye

mbodur@ktun.edu.tr

key-words: Baskakov operators, exponential functions, weighted modulus of continuity.

Abstract:
This talk aims to present an extension of the bivariate Baskakov operators that preserve some exponential functions. We investigate approximation results and provide some numerical and graphical examples to demonstrate the rate of convergence of the constructed operators.

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Bounded Variation Solution to Time Dependent Maximal Monotone Operator with Integral Perturbation

Aya Bouabsa[1], Soumia Saïdi[1]

[1] LMPA Laboratory, Department of Mathematics, Mohammed Seddik Ben Yahia University, Jijel, Algeria

ayabouabsa670@gmail.com

key-words: Integro-differential inclusion, maximal monotone operator, pseudo distance, bounded variation.

Abstract:
The aim of the present work is to study an evolution problem driven by time-dependent maximal monotone operators with integral perturbation in a suitable sense of bounded variation.

Intoduction The current work deals, in the context of a Hilbert space H, with the integro-differential inclusion of the form

$$\begin{cases} -\frac{dx}{dr}(t) \in A(t)x(t) + \int_0^t f(t,s,x(s))dr(s) & \text{dr-a.e. } t \in I, \\ x(0) = x_0 \in D(A(0)), \end{cases} \tag{9}$$

where $A(t) : D(A(t)) \subset H \to 2^H$ is a maximal monotone operator for all $t \in I$, and $D(A(t))$ stands for the domain of operator $A(t)$. The map $r : I \to [0, +\infty[$ is bounded variation continuous, and f is a Carathéodory mapping that satisfies suitable conditions.

We are motivated by the recent results [1] and [2] involving integro-differential sweeping processes. We use also some techniques from [3]. We contribute on this subject by considering evolution problems involving maximal monotone operators with integral perturbations, in the bounded variation continuous case. For the proof of the existence and uniqueness result, we use a discretization method. The well-posedness result provides remarkable applications such as minimization and relaxation problems.

After this brief introduction, we provide useful notation and necessary preliminaries. Then, we state our main results concerning the integro-differential inclusion above.

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Incomplete LU Factorization Preconditioners Using Two Methods of Storing a Sparse Matrix

Khalifa Boumzough[1], Adnane Azzouzi[2] and Abderrahim Bouidi[1]

[1] Department of mathematics, Ibn Zohr University, Agadir, Morocco
[2] Department of mathematics, Sidi Mohamed Ben Abdellah university, Fez, Morocco

khalifa.boumzough@edu.uiz.ac.ma, adnane.azzouzi@gmail.com, a.bouidi@uiz.ac.ma

key-words: Nonsymmetric Sparse linear system, incomplete LU preconditioner, krylov subspace, compressed sparse row (CSR), compressed sparse column (CSC).

Abstract:
A vast majority of problems in computational science and engineering can be described by PDEs. The discretization of these equations by numerical methods (finite element, finite difference, finite volume,...) leads to large sparse linear systems. Solving large sparse linear systems can lead to extremely long computation times. Although iterative methods for solving linear systems require less memory space than direct methods, the success of an iterative method depends firstly on the choice of the iterative method to accelerate the convergence and then depends on the storage method to obtain a better solution. In this work, we will focus on the study of incomplete LU factorization preconditioners. The idea is based on using two methods of storing a sparse matrix to compute incomplete LU factorization. The object of this technique is to minimize computation time.

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Refinements of Majorization Theorems Via Strong Convexity with Application

Slavica Ivelić Bradanović

Department of mathematics, University of Split, Faculty of Civil Engineering, Architecture and Geodesy, Split, Croatia

sivelic@gradst.hr

key-words: Majorization inequality, strongly convex functions, Csizar divergences.

Abstract:
The concept of majorization is a mathematical tool which allows us to see the existing connections between vectors. It has applications in different engineering and scientific problems. Majorization inequalities have central role in Majorization theory. We consider the weighted concept of majorization inequality and extend results to the class of n-strongly convex functions using extended idea of convexity to the class of strongly convex functions. We also present some applications to Csizar's divergences.

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Asymptotic Expansion of the Compound Mean with Application to the Arithmetic-geometric Mean

Tomislav Buri[1], Lenka Mihoković[1]

[1] Department of the Applied Mathematics, University of Zagreb, Zagreb, Croatia

tomislav.buric@fer.hr, lenka.mihokovic@fer.hr

key-words: Asymptotic expansion, compound mean, arithmetic-geometric mean.

Abstract:
Let us define an iterative process of two bivariate means M and N, for $s, t > 0$, in a following way:

$$\begin{aligned} M_0(s,t) &= s, & N_0(s,t) &= t, \\ M_n(s,t) &= M(M_{n-1}, N_{n-1}), & N_n(s,t) &= N(M_{n-1}, N_{n-1}), \quad n \geq 1. \end{aligned}$$

If both of these sequences converge to the same limit, this common value is called the Gaussian compound mean of s and t and is denoted by $M \otimes_g N(s,t)$. In this talk we present a complete asymptotic expansion of such Gaussian compound of two arbitrary homogeneous symmetric means and derive an efficient algorithm for computing coefficients in this expansion. This new approach leads to a simple recursive formula for coefficients in the expansion of the arithmetic-geometric mean. We also give application to the Gaussian compounds of some other classical means. By asymptotic expansion of a mean we consider representation of mean in a form

$$M(x+s, x+t) = x \sum_{n=0}^{\infty} c_n(s,t) x^{-n}, \quad x \to \infty,$$

where $c_n(s,t)$ are polynomials of the degree n in variables s and t. The technique of developing asymptotic expansions of means is presented in a series of recently published papers and is successfully used in the comparison of classical means and establishing various relations between means.

Multivalued Sehgal-Proinov Type Contraction Mappings Involving Rational Terms in Modular Metric spaces

Abdurrahman Büyükkaya[1], Mahpeyker Öztürk[2]

[1] Department of Mathematics, Karadeniz Technical University, Trabzon, Türkiye
[2] Department of Mathematics, Sakarya University, Sakarya, Türkiye

abdurrahman.giresun@hootmail.com, mahpeykero@sakarya.edu.tr

key-words: Sehgal fixed point, multivalued mappings, modular metric space.

Abstract:
In this study, inspired by Proinov type contractions, we aim to achieve new fixed point results, which will extend the Seghal's results, involving rational terms for multivalued mappings in the setting of modular metric space. Also, our consequences extensions and improvements of the existing literature.

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On Purely Infinite Ideals of Leavitt Path Algebra

Vural Cam

Department of Mathematics, Selcuk University, Konya, TURKEY

cvural@selcuk.edu.tr

key-words: Leavitt path algebra, extreme cycles, purely infinite ideals.

Abstract:
Let K be a field, and let E be a directed graph. $L_K(E)$ is the corresponding *Leavitt path K-algebra of E with coefficients in K*. P_{ec} is the set of vertices in extreme cycles of E. The ideal generated by P_{ec}, originally presented in [1], is a direct sum of purely infinite simple rings. In this talk we will see that, although the ideal generated by P_{ec} is purely infinite, it is not the largest with this property. Then we will determine the largest purely infinite ideal inside $L_K(E)$. At the end of the talk we will prove that, it is the direct sum of purely infinite simple ideals and purely infinite non-simple indecomposable ideals. This is a joint work with Cristóbal Gil Canto, Müge Kanuni and Mercedes Siles Molina.

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Pseudo-contractibility on Topological Spaces

David Maya[1], Félix Capulín[1], Leonardo Juárez[2], Enrique Castaẽda[2]

[1] Department of Mathematics, Universidad Autónoma del Estado de México, Toluca, México
[2] Institute of Mathematics, Universidad Nacional Autónoma de México, México City, México

dmayae@outlook.com, fcapulin@gmail.com, juvile06@gmail.com, eca@uaemex.mx

key-words: Homotopy, pseudo-homotopy, contractibilty, pseudo-contractibility, continuum.

Abstract:
A topological space is called a *continuum* if it is a nonempty compact connected metric space. Let X and Y be topological spaces, and let I be the unit interval. Two maps $f, g : X \to Y$ are called *homotopic* (written $f \simeq g$) if there exists a map $G : X \times I \to Y$ (called a homotopy) satisfying $G(x, 0) = f(x)$ and $G(x, 1) = g(x)$ for each $x \in X$. We say that f and g are *pseudo-homotopic* if there exist a continuum K, points $a, b \in K$ and a map $G : X \times K \to Y$ such that $G(x, a) = f(x)$ and $G(x, b) = g(x)$ for each $x \in X$. The map G is called a pseudo-homotopy between f and g with factor space K. We write $f \simeq_K g$. Then, a topological space X is said to be *contractible* if its identity map I_X is homotopic to a constant map in X, and a topological space X is said to be *pseudo-contractible* if its identity map I_X is pseudo-homotopic to a constant map in X. In this talk I am going to give an example where these concepts are different, also I will to give general properties about pseudo-homotopies and pseudo-contractibility and finally we will show some topological space where these concepts coincide.

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Stabilized Finite Element Simulations of Dam-break Problems

Süleyman Cengizci

Department of Computer Programming, Antalya Bilim University, Antalya, Türkiye

suleyman.cengizci@antalya.edu.tr
key-words: Shallow-water equations, dam-break problem.

Abstract:
This study concerns stabilized finite element simulations of dam-break problems. Towards this end, two test simulations, i.e., a full [1] and a partial [2] dam-break problem, are performed. The shallow-water model adopted is from [3]. In carrying out the computations, the streamline-upwind/Petrov–Galerkin (SUPG) [4] formulation is employed as the main method. The stabilized formulation is further augmented with the YZβ discontinuity-capturing [5] technique. The test computations reveal that the proposed formulation and techniques achieve good shock representations near strong gradients without exhibiting any oscillatory behavior.

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On the Existence of Solutions for a Class of Hilfer-Hadamard Fractional Integro-differential Inclusion

Aurelian Cernea

Faculty of Mathematics and Computer Science, University of Bucharest, Bucharest, Romania

acernea@fmi.unibuc.ro

key-words: Differential inclusion, fractional derivative, boundary value problem.

Abstract:
We consider the following fractional integro-differential inclusion

$$D^{\alpha,\beta}_{HH}x(t) \in F(t, x(t), V(x)(t)) \quad a.e.\ ([1, T])$$

with boundary conditions of the form

$$x(1) = 0, \quad x(T) = \sum_{j=1}^{m} \eta_j x(\xi_j) + \sum_{i=1}^{n} \zeta_i I^{\varphi_i}_{H} x(\theta_i) + \sum_{k=1}^{r} \lambda_k D^{\omega_k}_{H} x(\mu_k),$$

where $D^{\alpha,\beta}_{HH}$ is the Hilfer-Hadamard fractional derivative of order $\alpha \in (1, 2]$ and type $\beta \in [0, 1]$, $\xi_j, \theta_i, \mu_k \in (1, T)$, $\eta_i, \zeta_j, \lambda_k \in \mathbf{R}$, $j = \overline{1, m}, i = \overline{1, n}, k = \overline{1, r}$, I^{φ}_{H} is the Hadamard fractional integral of order $\varphi > 0$, D^{ω}_{H} is the Hadamard fractional derivative of order $\omega > 0$, $F : [1, T] \times \mathbf{R} \times \mathbf{R} \to \mathcal{P}(\mathbf{R})$ is a set-valued map and $V : C([1, T], \mathbf{R}) \to C([1, T], \mathbf{R})$ is a nonlinear Volterra integral operator defined by $V(x)(t) = \int_0^t k(t, s, x(s))ds$ with $k(., ., .) : [1, T] \times \mathbf{R} \times \mathbf{R} \to \mathbf{R}$ a given function.

Our aim is to obtain the existence of solutions for problem above in the case when the set-valued map F has nonconvex values but it is assumed to be Lipschitz in the second and third variable. We essentially use Filippov's techniques ([2]); namely, the existence of solutions is obtained by starting from a given "quasi" solution. In addition, the result provides an estimate between the "quasi" solution and the solution obtained. Our result improve an existence theorem in [1] in the case when the right-hand side is Lipschitz in the second variable. Moreover, it may be viewed as a generalization to the case when the right-hand side contains a nonlinear Volterra integral operator.

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On the Structure of the Fatou set of a Certain Family of Iranscendental Entire Functions

Subham Chatterjee[1], Soumyadip Majee[1] and Gorachand Chakraborty[1]

[1] Department of Mathematics, Sidho Kanho Birsha University, Purulia, West Bengal, India Pin-723104

subham.acad.res@gmail.com, soumyadipmajee1998@gmail.com, gorachand11@gmail.com

key-words: Fatou set, Julia set, Wandering domain, Transcendental entire function.

Abstract:
We study the dynamics of a certain family of transcendental entire functions having infinitely many singular values. We discuss about the change in the dynamics of the family as the parameter changes. We examine the existence of various periodic Fatou components like immediate attracting basins, parabolic domains, Siegel disk etc for the family. We examine the existence of wandering domains for the family. Also, we investigate the dynamics of the family for complex values of the parameter. Finally, we compare the dynamics of different families of functions.

References

A Mathematical Model on Impact of Meditation on Suicidal Thoughts

M. Chaudhary

Presidency University Bangalore, 560064, India

manisha23june@gmail.com

key-words: Keywords1, keywords2, keywords3.

Abstract:
In this paper a non-linear mathematical model for the impact of meditation on suicidal thoughts due to different symptoms has been discussed based on the previous studies. In the modeling process the growth rate of awareness programs impacting the population is assumed to be proportional to the numbers of person who have suicidal thoughts and who have died cause of suicide. The model is analyzed by using stability theory of differential equations. From this analysis and simulation it is found that suicidal thoughts and suicide cases can be prevented, controlled or at least delayed by introducing effective awareness programs. Suicidal thoughts due to the world-wide pandemic is also a serious concern and it can be controlled by Meditation and timely help by suicide prevention helplines that are functioning amidst the pandemic. The numerical simulation analysis of the model confirms the analytical results.

References

Supersymmetric Polynomials and a Set of Multisets

Iryna Chernega[1], Andriy Zagorodnyuk[2]

[1] Department of Analysis, Geometry and Topology, Institute for Applied Problems of Mechanics and Mathematics, Lviv, Ukraine
[2] Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Ukraine

icherneha@ukr.net, andriy.zagorodnyuk@pnu.edu.ua

key-words: Ring of multisets, topological rings, supersymmetric polynomials.

Abstract:
In the talk we consider possible generalizations of results about rings of multisets, obtained in [1] (see, also [2]), for more general cases. Let us consider a Banach space $\Lambda_X(\mathcal{D})$ of sequences $(x_1, x_2, \ldots, x_n, \ldots)$, where x_n are elements of a multiplicative semigroup $\mathcal{D}$ of Banach algebra $\mathcal{A}$, and each sequence of norms, $(\|x_1\|_{\mathcal{A}}, \|x_2\|_{\mathcal{A}}, \ldots, \|x_n\|_{\mathcal{A}}, \ldots)$ is a vector in a Banach space X with a norm $\|\cdot\|_X$ and a symmetric basis $\{e_n\}$.

A topological basis is called *symmetric* if it is equivalent to the basis $\{e_{\sigma(n)}\}$ for every permutation σ on the set of natural numbers. It means that for every σ, a series $\sum_{n=1}^{\infty} x_n e_n$ converges if and only if $\sum_{n=1}^{\infty} x_n e_{\sigma(n)}$ converges.

Next we introduce a semigroup of "supersymmetry" on $\Lambda_X(\mathcal{D})$ and denote by $\mathcal{M}_X(\mathcal{D})$ the set of classes of the equivalence with respect to actions of the semigroup. We will show that $\mathcal{M}_X(\mathcal{D})$ is a ring with respect to some natural operations (the *ring of multisets* in $\mathcal{D}$). We will discuss basic properties of the ring. In particular, we will show that $\mathcal{M}_X(\mathcal{D})$ is complete in a natural metrizable topology induced from X. We investigate homomorphisms of $\mathcal{M}_X(\mathcal{D})$ and related supersymmetric polynomials on $\Lambda_X(\mathcal{D})$.

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Stabilization of Degenerate Wave Equation Under Fractional Feedback Acting on the Degenerate Boundary

Fatiha Chouaou

University Center Maghnia, Maghnia, Algeria

drchouaou@gmail.com

key-words:

Abstract:
In this work, we are concerned with the study of stabilization of one-dimentional weakly degenerate wave equation $u_{tt} - (x^{\gamma} u_x)_x = 0$ with $x \in (0,1)$ and $\gamma \in [0,1)$, controlled by a fractional boundary feedback acting at $x = 0$ and at $x = 1$. Strong, uniform, and nonuniform stabilization are obtained with explicit decay estimates in appropriate spaces. The results are obtained through an estimate on the resolvant of the generator associated with the semigroup.

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A Method to Build Your Own Autonomous Weather Station and to Validate it with Tools of Statistical Mathematics

Andrei-Călin Cîrstea[1], Liviu-Constantin Baboi[1], Gabriel Ghişoiu[1], Elena-Andreea Ştefănescu[1] and Amelia Bucur[2]

[1] Department of Machines and Industrial Equipment, Lucian Blaga University of Sibiu, Faculty of Engineering, Sibiu, Romania
[2] Department of Mathematics and Informatics, Lucian Blaga University of Sibiu, Faculty of Sciences, Sibiu, Romania

andreicalin.cirstea@ulbsibiu.ro, liviuconstantin.baboi@ulbsibiu.ro, gabriel.ghisoiu@ulbsibiu.ro, elenaandreea.stefanescu@ulbsibiu.ro, amelia.bucur@ulbsibiu.ro

key-words: Weather station; sensors; statistical mathematics.

Abstract:
A weather station is an ensemble of sensors and indicators that shows live data about the weather in the environment. This data needs to be very accurate, with an exceptional precision, in order to help us speak about an accurate data interpretation and processing. In this paper we present you our prototype. We consider that mathematics is very important in data processing so we can examine the data easier, but it also helps us get to conclusions that we could not achieve without it. The values we obtained after the mathematical processing show the fact that the station transmitted precise data for temperature, humidity and pressure, but had little errors in transmitting the data about UV radiation, light intensity and air quality. In this case, we can say that the weather station works correctly and this is confirmed using tools of mathematical statistics, because the results given by the SPSS software for correlations and regressions meet the general expectations for the analyzed variables.

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Triangular Matrix Categories Over Path Categories and Quasi-hereditary Categories, as well as One-Point Extensions by Projectives

Rafael Francisco Ochoa de la Cruz[1] and Martín Ortiz Morales[2]

[1] Instituto de Matemáticas, Universidad Nacional Autónoma de México, Mexico City, Mexico
[2] Facultad de Ciencias, Universidad Autónoma del Estado de México, Mexico City, Mexico

rochoa@matcom.uh.cu, mortiz@matmor.unam.mx

key-words: Path Categories, functor Categories, Quasi-hereditary categories, matrix categories.

Abstract:
We prove that the lower triangular matrix category $\Lambda = \left[\begin{smallmatrix} \mathcal{T} & 0 \\ M & \mathcal{U} \end{smallmatrix}\right]$, where $\mathcal{T}$ and $\mathcal{U}$ are quasi-hereditary Hom-finite Krull-Schmidt K-categories and M is a $\mathcal{U} \otimes_K \mathcal{T}^{op}$-module that satisfies suitable conditions, is quasi-hereditary in the sense of [3] and [5]. Moreover, we solve the problem of finding quotients of path categories isomorphic to the lower triangular matrix category Λ, where $\mathcal{T} = K\mathcal{R}/\mathcal{J}$ and $\mathcal{U} = K\mathcal{Q}/\mathcal{I}$ are path categories of infinity quivers modulo admissible ideals. Finally, we study the case where Λ is a path category of a quiver Q with relations and $\mathcal{U}$ is the full additive subcategory of Λ obtained by deleting a source vertex $*$ in Q and $\mathcal{T} = \operatorname{add}\{*\}$. We then show that there exists an adjoint pair of functors $(\mathcal{R}, \mathcal{E})$ between the functor categories $\operatorname{mod} \Lambda$ and $\operatorname{mod} \mathcal{U}$ that preserve orthogonality and exceptionality; see [1]. We then give some examples of how to extend classical tilting subcategories of $\mathcal{U}$-modules to classical tilting subcategories of Λ-modules.

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Kashuri Fundo Transform for Solving Chemical Reaction Models

Haldun Alpaslan Peker[1], Fatma Aybike Çuha[2] and Bilge Peker[3]

[1] Department of Mathematics, Selçuk University, Konya, Türkiye
[2] Graduate School of Natural and Applied Sciences, Selçuk University, Konya, Türkiye
[3] Department of Mathematics and Science Education, Necmettin Erbakan University, Konya, Türkiye

pekera@gmail.com, fatmaaybikecuha@gmail.com, bpeker@erbakan.edu.tr

key-words: Kashuri Fundo transform, inverse Kashuri Fundo transform, chemical reaction models.

Abstract:
There are certain rules in the background of every event that we encounter in many areas of our lives and every invention that is revealed. These rules in the background of events or inventions, especially in fields such as applied mathematics, engineering, physics and chemistry, are modeled with differential equations and made easier to interpret. The considered chemical reaction models in this study are models that include ordinary differential equations. The solutions of such equations can sometimes be quite complex. In order to eliminate this confusion, integral transforms can be used to reach solutions in general. Integral transforms are preferred methods because they transform differential equations into algebraic equations and provide a more understandable and shorter solution. In this study, we have used an integral transform, called the Kashuri Fundo transform, to arrive at the solution of some chemical reaction patterns. The results revealed that the Kashuri Fundo transform is a suitable, reliable and powerful method for solving differential equations.

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Hahn-Banach Smoothness in Sequence Spaces

Soumitra Daptari

School of Mathematical Sciences, National Institute of Science Education and Research Bhubaneswar (NISER), Odisha, India

daptarisoumitra@gmail.com

key-words:

Abstract:
The uniqueness of the Hahn-Banach extension is always a topic of interest in functional analysis. The norm-preserving extension (also known as the Hahn-Banach extension) of a bounded linear functional on a subspace Y of normed linear space X is guaranteed by the Hahn-Banach extension theorem. If every bounded linear functional on Y has a unique norm-preserving extension to X, then Y is said to have property-(U) in X (Y is also called Hahn-Banach smooth subspace of X) [3]. It is known that Y has property-(U) if and only if $P_{Y^\perp}(x^*)$ is singleton for all $x^* \in X^*$ (see [3, Theorem 1.1]), where $P_{Y^\perp} : X^* \to 2^Y$ is closed convex set-valued, is defined by $P_{Y^\perp}(x^*) = \{y^\perp \in Y^\perp : d(x^*, Y^\perp) = \|x^* - y^\perp\|\}$. It is called the metric projection of $Y^\perp$. If $P_{Y^\perp}$ is linear, then Y is said to have property-(SU) in X (see [1, Theorem 3.3]). In this case, one can check that $\|I - P_{Y^\perp}\| = 1$. In addition, if $\|P_{Y^\perp}\| = 1$, then Y is said to have property-(HB) in X (see [1, Theorem 3.4]). (The original definitions of property-(SU) and property-(HB) were introduced in [4] and [1], respectively). Finally, if $\|x^*\| = \|P_{Y^\perp}(x^*)\| + \|(I - P_{Y^\perp})(x^*)\|$ for all $x^* \in X^*$, then Y is called an M-ideal in X.

In this talk, we discuss Hahn-Banach smoothness and the aforementioned stronger notions. In the first half of the talk, we study some preliminaries on property-$(U)/(SU)/(HB)$. In the second half, we will discuss these properties in sequence spaces. We describe finite-dimensional and finite co-dimensional subspaces as having these properties in c_0, ℓ_p for $1 \le p < \infty$ and Orlicz sequence spaces.

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Some Unsolved Problems on Extremal Decomposition of the Complex Plane

Iryna Denega

Department of complex analysis and potential theory, Institute of Mathematics of the National Academy of Sciences of Ukraine, Kyiv, Ukraine

iradenega@gmail.com

key-words: Green's function, inner radius of the domain, Möbius invariant.

Abstract
Let $\mathbb{C}$ be the complex plane, and let $\overline{\mathbb{C}} = \mathbb{C}\bigcup\{\infty\}$ be its one-point compactification. A function $g_B(z,a)$ which is continuous in $\overline{\mathbb{C}}$, harmonic in $B\backslash a$ apart from z, vanishes outside B, and in the neighborhood of a has the following asymptotic expansion

$$g_B(z,a) = -\ln|z-a| + \delta + o(1), \quad z \to a,$$

is called the (classical) Green function of the domain B with pole at $a \in B$. For $a = \infty$ we define the function $g_B(z,\infty)$ in a similar way $g_B(z,\infty) = \ln|z| + \delta + o(1)$, $z \to \infty$. The inner radius $r(B,a)$ of the domain B with respect to a point a is the quantity e^{δ} (see, for example, [1, 2]).

Consider the estimates for a general Möbius invariant, which looks like

$$T_n := \prod_{k=1}^{n} r(B_k, a_k) \left\{ \prod_{1\leqslant k<p\leqslant n}^{\prime} |a_k - a_p| \right\}^{-\frac{2}{n-1}}. \tag{10}$$

The primed product means that the corresponding factor for the infinitely distant point equals unity. M.A. Lavrentiev in 1934 proved an accurate estimate $T_2 \leqslant 1$. In 1951, G.M. Goluzin obtained the following inequality

$$T_3 \leqslant \frac{64}{81\sqrt{3}}.$$

G.V. Kuzmina in 1998 shown that the problem of estimating T_4 is reduced to the problem of the lowest capacity in a family of continuums

$$T_4 \leqslant 3^2 \cdot 4^{-8/3}.$$

The problem of finding the maximum for (10) at $n \geqslant 5$ still remains unsolved.

In the paper [3], we give proof of the following estimate

$$T_n \leqslant (n-1)^{-\frac{n}{4}}$$

in which the generalized M.A. Lavrentiev inequality is substantially applied.

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$\Psi-$Ideal Convergence of Double Positive Linear Operators of Functions of Two Variables for Analytic P-ideals

Kamil Demirci[1], Fadime Dirik[1] and Sevda Yıldız[1]

[1] Department of Mathematics Sinop University Sinop, Türkiye

kamild@sinop.edu.tr, fdirik@sinop.edu.tr, sevdaorhan@sinop.edu.tr

key-words: $\Psi-$statistical convergence, ideal convergence, analytic P-ideals, the Korovkin theorem, Berstein-Stancu operator.

Abstract:
The subject of Korovkin-type theory was initiated by Korovkin in 1960 in his pioneering paper [4] then, this theory has been widely studied and it is worthwhile to point out that, it is about approximation to continuous functions by means of positive linear operators. Dirik and Demirci ([3]) have studied the Korovkin-type approximation thorem using the notion of equi-ideal convergence for analytic P-ideals. Then, Bardaro et al. ([1, 2]) have introduced a more general notion of statistical convergence for double sequences of positive linear operators named "triangular $A-$statistical convergence" and they have obtained a Korovkin type approximation theorem in $C(U)$, which is the space of all continuous real functions defined in a compact subset $U \subset \mathbb{R}^2$ and they have introduced a general definition of triangular $A-$statistical convergence using a suitable function $\Psi : \mathbb{N} \times \mathbb{N} \to \mathbb{R}$. After these remarkable works, authors have studied some generalizations of them. In this work, we introduce an extension of $\Psi-$statistical convergence to the class of all analytic P-ideals for sequences called $\Psi-$ideal convergence. Also using this convergence, we prove a Korovkin type approximation theorem for double sequences. We compute the rates of $\Psi-$ideal convergence of positive linear operators.

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Calderón-Zygmund operators on regular BMO spaces

Evgueni Doubtsov[1] and Andrei V. Vasin[2]

[1] St. Petersburg Department of Steklov Mathematical Institute, St. Petersburg, Russia
[2] Admiral Makarov State University of Maritime and Inland Shipping, St. Petersburg, Russia

dubtsov@pdmi.ras.ru, andrejvasin@gmail.com

key-words: Calderón-Zygmund operators, non-doubling measures, regular BMO spaces.

Abstract:
For a positive Radon measure μ on $\mathbb{R}^m$, Tolsa [2] introduced $\mathrm{RBMO}(\mu)$, the regular BMO space with respect to μ. This space is suitable for the non-doubling measures μ and it has genuine properties of the classical space BMO. Also, it is proved in [2] that a bounded on $L^2(\mu)$ Calderón-Zygmund operator maps $L^\infty(\mu)$ into $\mathrm{RBMO}(\mu)$. Motivated by this result, we obtain a T1 condition sufficient for the boundedness of Calderón-Zygmund operators on $\mathrm{RBMO}(\mu)$.

By definition, a cube is a closed cube in $\mathbb{R}^m$ with sides parallel to the axes. For a cube Q, let $\ell = \ell(Q)$ denote its side-length. The notation $Q(x, \ell)$ is used to indicate explicitly the center x and the side-length ℓ. Given a finite positive measure μ on $\mathbb{R}^m$ and two cubes $Q \subset R$ in $\mathbb{R}^m$, put

$$K(Q,R) = 1 + \sum_{j=1}^{N_{Q,R}} \frac{\mu(2^j Q)}{\ell^n(2^j Q)},$$

where $N_{Q,R}$ is the minimal integer s such that $\ell(2^s Q) \geq \ell(R)$. Also, for a cube $Q \subset \mathbb{R}^m$, put $K(Q) = K(Q, 2^k Q)$, where k is the smallest positive integer such that $2\mu(2^k Q) > \mu(\mathbb{R}^m)$.

THEOREM (see [1]). Let μ be a finite positive n-dimensional measure on $\mathbb{R}^m$, $0 < n \leq m$. Let T be a Calderón-Zygmund operator with kernel $\mathcal{K}$ such that

$$\left| \int_{Q(x,R)\setminus Q(x,r)} \mathcal{K}(x,y)\, d\mu(y) \right| \leq C, \quad x \in \mathbb{R}^m,\ 0 < r < R.$$

Assume that for each doubling cube $Q \subset \mathbb{R}^m$, there exists a constant b_Q such that

$$\frac{1}{\mu(Q)} \int_Q |T1 - b_Q|\, d\mu \leq \frac{C}{K(Q)} \text{ for all doubling cubes } Q,$$

$$|b_Q - b_R| \leq C \frac{K(Q,R)}{K(Q)} \text{ for all doubling cubes } Q, R,\ Q \subset R,$$

where $C > 0$ does not depend on Q and R. Then T is bounded on $\mathrm{RBMO}(\mu)$.

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Isotropic Surfaces in the De Sitter Space $S_1^3(1) \subset R_1^4$ Via Complex Variables

Martha P. Dussan

Department of Mathematics, University of Sao Paulo, Sao Paulo, Brazil

dussan@ime.usp.br

key-words:

Abstract:
In this talk we present a method of describing all isotropic surfaces in $S_1^3(1)$ using complex variable. Our main goal is to re-introduce complex analysis into the study of isotropic minimal surfaces using parametrizations of the null cone and spacelike planes. In particular, we use stereographic projection to identify necessary and sufficient conditions for lifting our isotropic surfaces in $S_1^3(1)$ into a special complex quadric of the complex projective space and then we study that surfaces. In particular we introduce a new class of complex functions, called *quasi-holomorphic*, that contains the holomorphic and anti-holomorphic functions. Next, we obtain a remarkable correspondence between isotropic minimal surfaces in $S_1^3(1)$ and pairs of quasi-holomorphic functions. This work is joint with Prof. A.P. Franco-Filho (IME-USP) and M. Magid (Wellesley College).

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On the Reliability of Rose Window Graphs

Gülnaz Boruzanlı Ekinci

Department of Mathematics, Faculty of Science, Ege University, Izmir, Türkiye

gulnaz.boruzanli@ege.edu.tr

key-words: Reliability, fault tolerance, rose window graphs.

Abstract:
Given natural numbers $n \geq 3$ and $1 \leq a, r \leq n-1$, the rose window graph $R_n(a, r)$ is defined by Wilson [1] to be the quartic graph with the vertex set $V = \{x_i \mid i \in \mathbb{Z}_n\} \cup \{y_i \mid i \in \mathbb{Z}_n\}$ and the edge set $\{\{x_i, x_{i+1}\} \mid i \in Z_n\} \cup \{\{y_i, y_{i+r}\} \mid i \in Z_n\} \cup \{\{x_i, y_i\} \mid i \in Z_n\} \cup \{\{x_{i+a}, y_i\} \mid i \in Z_n\}$. Various aspects of this class of graphs have been investigated in literature, especially the symmetries of these graphs and their relation to certain symmetric maps. This work initiates the study of reliability in rose window graphs by considering a natural generalization of the classical connectivity notion, namely the h–extra connectivity. For a nonnegative integer h, the h–extra connectivity of G, denoted by $\kappa_h(G)$, is the minimum cardinality of a set of vertices in G, if it exists, whose deletion disconnects G and every remaining component has at least $h+1$ vertices. The obtained results are of great importance in evaluating the fault tolerance of the considered class.

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Studying the Terms of Triangular Heptagonal Numbers

Ahmet Emin

Department of mathematics, Faculty of Sciences, Karabük University, Karabük, Turkey

drahmetemin@gmail.com

key-words: Polygonal numbers, pell equation, fibonacci and lucas numbers.

Abstract:
Polygonal numbers or n-gonal numbers are positive integers that can be represented by regular geometric forms. Starting from a point, it continues to increase by the same common difference. If the common difference is one, then the geometric pattern is called triangular numbers. If the common difference is five, then the geometric pattern is called heptagonal numbers.

A triangular number is a positive number of the form $\frac{n(n+1)}{2}$, $n \in \mathbb{N}$, and denoted by $S_3(n)$. Also, a heptagonal number is a positive number of the form $\frac{n(5n-3)}{2}$, $n \in \mathbb{N}$, and denoted by $S_7(n)$.

Triangular heptagonal numbers are both triangular numbers and heptagonal numbers. In this talk we mention about which numbers are simultaneously triangular and heptagonal numbers (i.e. triangular heptagonal numbers).

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Cartan Null and Pseudo Null Bertrand Curves in Minkowski 3-Space Revisited

Hatice Altın Erdem[1], Kazm larslan[1]

[1] Department of Mathematics, Kırıkkale University, Kırıkkale, Türkiye

hatice_altin@yahoo.com, kilarslan@yahoo.com

key-words: Bertrand curves, null curves, Cartan null curves, pseudo null curves, principle normal, Minkowski 3-space.

Abstract:
In the theory of curves in Euclidean 3-space, it is well known that a curve β with non-zero curvatures is said to be a Bertrand curve if for another curve $\beta^{\star}$, there exists a one-to-one correspondence between β and $\beta^{\star}$ such that both curves have common principle normal line. These curve have been studied in different space over a long period of time and found wide application in different areas. Therefore, we have a great knowledge of the geometric properties of these curves. In [2], the authours gave a new perspective to Bertrand curves. This point of view was also carried to curves in Minkowski 3-space [1], [4]. In [5], new results for spacelike Bertrand curves was obtained in the light of recent studies on Bertrand curves. In this talk, revested results for Cartan null and pseudo null Bertrand curves with spacelike and timelike principle normal will be given with the previous studies on Bertrand curves and related examples that meet these results will be given.

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The New Aspect to Fixed Point Theory on Orthogonal Metric Space

Eşref Erdoğan[1], Aybala Sevde Özkapu[1] and Özlem Acar[1]

[1] Department of Mathematics, Faculty of Science, Selçuk University, Konya, Türkiye

esreferdogan@yahoo.com, aybalasevdeozkapu.007@yahoo.com, ozlem.acar@selcuk.edu.tr

key-words: Fixed point, F-contraction, orthogonal metric space.

Abstract:
Recently, Gordji et al. [5] for the first time, introduced the concept of orthogonality, and obtained the fixed point result on orthogonal metric space. Furthermore, they gave the application of this results for the existence and uniqueness of the solution of a first-order ordinary diferential equation, while the Banach [2] contraction mapping principle cannot be applied in this situation. Then Sawangsup, Sintunavarat and Cho [10] introduced the new concept of an orthogonal F-contraction mappings and proved the fixed point theorems on orthogonal complete metric space. In this talk, we discuss and investigate the problem of the existence and uniqueness of some contraction type mappings on orthogonal metric space.

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An Hopf-type Lemma for Elliptic Problems Involving Singular Nonlinearities

Francesco Esposito

Department of Mathematics and Computer Science, University of Calabria, Rende (CS), Italy

francesco.esposito@unical.it

key-words: Hopf boundary lemma, singular nonlinearities.

Abstract:
In this talk we consider positive solutions to some semilinear and quasilinear elliptic problems involving singular nonlinearities. We provide an Hopf type boundary lemma via a suitable scaling argument that allows to deal with the lack of regularity of the solutions up to the boundary.

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Optimization of Financial Planning of Enugu State Broadcasting Service (ESBS)

P. N. Ezra[1], J. C. Nzekwe[1], L. O.Agbo[1]

[1] Department of Statistics, University of Nigeria, Nsukka, Nigeria

precious.ezra@unn.edu.ng, joshua.nzekwu249167@unn.edu.ng,lynda.agbo244036@unn.edu.ng key-words: Optimization, goal, goal programming, financial planning and optimization technique.

Abstract:
This study examines the optimization of the financial planning of Enugu State Broadcasting Service (ESBS) using goal programming technique based on the current data. The goals / targets of the organization are to maximize the cash reserve, maximize the employment benefits, minimize general expenditure, minimize the capital expenditure, and as well the operating capital, minimize the amount they give out as loans, and also minimize the total financial budget. The study proposed the use of combined Weighted and Pre-emptive goal programming technique for solving the formulated multiple objective goal programming problems. The proposed methodology was tested on the financial estimates of ESBS between 2018 and 2021. The obtained results revealed that the proposed methodology was efficient in solving the company's financial planning optimization problem. Based on the findings from this study, it is therefore recommended that the firm should increase their workers employment benefits so as to encourage the workers to put in more effort which will in turn enhance their revenue optimization.

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A Uniqueness Theorem for Sturm-Liouville Equations with a Spectral Parameter Nonlinearly Contained in the Boundary Condition

Khanlar Mamedov[1] and Ramin Farzullazadeh[2]

[1] Department of Mathematics, Igdir University, Igdir, Türkiye
[2] Department of Mathematics and Informatics, Lankaran State University, Lankaran, Azerbaijan

hanlar.residoglu@igdir.edu.az, ramin.ferzulla@gmail.com

key-words: Inverse scattering problem, a uniqueness theorem, scattering data.

Abstract:

In this paper, we consider the differential equation on the half line $[0, \infty)$

$$-z'' + p(x)z = \lambda^2 z, \tag{11}$$

and the boundary condition

$$(\alpha_0 + \alpha_2\lambda^2)z'(0) - (\beta_0 + \beta_1\lambda + \beta_2\lambda^2)z(0) = 0. \tag{12}$$

Here λ is a complex parameter, $p(x)$ is a real valued Lebesgue measurable function satisfying the condition

$$\int_0^\infty x|p(x)|dx < \infty. \tag{13}$$

The purpose of this paper is to investigate the inverse scattering problem of the boundary value problem 11–13. The direct and inverse scattering problems for the classical case $(\alpha_2 = \beta_1 = \beta_2 = 0)$ completely solved in [1, 2]. A similar problem for the boundary value problem 11–13 with spectral parameter in boundary condition 12 was investigated in [3, 4].

Note that, as different from the previous work (different from the self-adjoint case) the zeros of the Jost function do not lie on the imaginary axis, lie on the complex plane and these zeros are not simple or the boundary value problem 11–13 may have complex eigenvalues. For this reason, the scattering data of the problem 11–13 is differently defined.

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Certain Results on Cumulants and Higher Order Probability Distribution Cumulants

Sandra Ferreira[1], Dário Ferreira[1]

[1] Mathematics Department and Center of Mathematics and Applications, University of Beira Interior, Covilhã, Portugal

sandraf@ubi.pt, dario@ubi.pt

key-words: Central Moments, cumulants, moments

Abstract:
In this presentation, a review of results on cumulants is made and a study of cumulants of higher-order probability distributions is presented, which correspond to sets of quantities that provide an alternative to the distribution moments. The well-known higher order cumulants are variance (second order), skewness (third order), measurement skewness and kurtosis (fourth order), measuring 'peak' of the probability distribution. Of particular interest is the fourth cumulant. Next, multivariate cumulants are presented and it is shown that the relationship between moments and cumulants is simpler in the multivariate case. It is considered an application of cumulants in mixed linear models.

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Some Properties of Stop-loss Moments Under Biased Sampling

Indranil Ghosh[1], N. Vipin[2] and S. M.Sunoj[3]

[1]Department of Mathematics and Statistics, University of North Carolina, Wilmington, USA 28403
[2] Department of Data Science, PSPH, Manipal Academy of Higher Education, Karnataka, India 576104
[3] Department of Statistics, Cochin University of Science and Technology, Kerala, India 682 022

ghoshi@uncw.edu, vipinn.stats@gmail.com, smsunoj@cusat.ac.in

key-words: Stop-loss transform, Weighted distributions; Hidden Truncation Models, Empirical estimation, Biased sampling.

Abstract:
To obtain a standardized layout, we ask all authors to use the The stop-loss moments have generally used as useful summary measures for analyzing the data which exceeds specific thresh- old levels. In many scientific studies the investigator cannot record the sampling units with equal probability, lead to a biased or weighted sampling. In the present study we examine the usefulness of stop-loss moments in biased sampling. The application of the weighted stop-loss moments in analyzing biased data have been investigated and compared using different empirical estimators through simulated and real data sets.

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Fixed Points of Simulative Contraction in Super Metric Spaces

Ekber Girgin[1], Mahpeyker Öztürk[2]

[1] Department of Fundamental Engineering Sciences, Sakarya University of Applied Science, Sakarya, Türkiye
[2] Department of Mathematics, Sakarya University, Sakarya, Türkiye

ekbergirgin@subu.edu.tr, mahpeykero@sakarya.edu.tr

key-words: Simulation function, fixed point, super metric.

Abstract:
In this talk, we establish fixed point results for simulative contraction in super metric space which is a new type metric space introduced by Karapinar and Fulga. Our results generalize and improve various comparable results in the literature.

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Identities and Approximations Obtained by Special Vertices of the Suborbital Graphs and Some Special Sequences

Ibrahim Gökcan[1], Ali Hikmet Değer[2]

[1] Department of Mathematics, Artvin Çoruh University, Artvin, Turkey
[2] Department of Mathematics, Karadeniz Technical University, Trabzon, Turkey

gokcan4385@gmail.com, ahikmetd@ktu.edu.tr

key-words: Approximation, identity, suborbital graph.

Abstract:
Suborbital graphs, $G_{u,N}$ and $F_{u,N}$ based on ideas from [1] are studied extensively in the last years. In particular, the vertices obtained on $F_{u,N}$ are generalized and written as some values of special number sequences. It is demonstrated that each vertex has a structure of continued fraction in [2] and associated with Fibonacci numbers for special values in [3].
In this study, it is aim to achieve to some identities and approximations. In [3], it is written as $p_n = (-1)^n F_{2n}$, where the n^{th} numerator is p_n of the continued fraction. It is known that $F_n \cong \frac{\alpha^n}{\sqrt{5}}$ for $n \to \infty$. From here, $p_n \cong (-1)^n \frac{\alpha^n}{\sqrt{5}} L_n$, where L_n is the n^{th} term of Lucas number sequences. Then the vertex is obtained as Lucas numbers. Also, some identities and approximations are reached by using identities $L_{2n} = (-1)^n tr[S_n]$, $5F_{2n} = (-1)^n tr[H_n]$,$Q_{2n} = \frac{(-1)^n}{2} tr[R_n]$ and $P_{2n} = \frac{(-1)^n}{16} tr[Z_n]$ in [4] related with Pell and Pell-Lucas numbers, where S_n, H_n,R_n and Z_n are special matrices.

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An Identification Problem for a Differential-Difference Equation with an Integral Term

İsmet Gölgeleyen

Department of Mathematics, Faculty of Science, Zonguldak Bülent Ecevit University, Zonguldak, Türkiye

ismet.golgeleyen@beun.edu.tr

key-words: Differential-difference equation, identification problem.

Abstract:
Differential-difference equations arise in mathematical modeling of various processes of natural sciences and socio-economic phenomena, [1,2]. For instance, in nanotechnology, since the space at the quantum scale is not a continuum at all, and the continuum hypothesis on the nanoscale is not valid, these equations play an important role in describing heat/electron conduction and flow in carbon nanotubes and nanoporous materials, [3,4].

In this work, we consider an identification problem for a differential-difference equation with an integral term. Identification in dynamical systems is a set of methods for constructing mathematical models of these systems based on the observations. Namely, identification is the determining of an unknown object from its characteristics. We deal with two inverse problems and obtain the solutions by using the given data.

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Economic Trend Resistant Designs Based on Hadamard Matrices

Ahlam Guiatni[1] and Hisham Hilow[2]

[1] Department of Mathematics, University of Jijel, Jijel, Algeria
[2] Department of Mathematics, University of Jordan, Amman, Jordan

ahlam.guiatni@univ-jijel.dz, hilow@ju.edu.jo

key-words: sequential fractional factorial experimentation, time trend free systematic run orders, generalized foldover scheme for sequencing experimental runs, the total cost of factor level changes between successive runs, the Normalized Sylvester-Hadamard Matrices, orthogonal arrays and factor projection, design resolution and the alias structure .

Abstract:
This article utilizes the Normalized Sylvester-Hadamard Matrices of size $2^k \times 2^k$ and their associated saturated orthogonal arrays $OA(2^k, 2^k - 1, 2, 2)$ to propose an algorithm based on factor projection (Backward/Forward) for the construction of three systematic run-after-run $2^{n-(n-k)}$ fractional factorial designs: (i) minimum cost trend free $2^{n-(n-k)}$ designs of resolution III $(2^{k-1} \leq n \leq 2^k 1k)$ by backward factor deletion (ii) minimum cost trend free $2^{n-(n-k)}$ designs of resolution III $(k + 1 \leq n \leq 2^{k-1}2 + k)$ by forward factor addition (iii) minimum cost trend free $2^{n-(n-k)}$ designs of resolution IV $(2^{k-2} \leq n \leq 2^{k-1} - 2)$ where each $2^{n-(n-k)}$ design is economic minimizing the number of factor level changes between the 2^k successive runs and allows for the estimation of all factor main effects unbiased by the linear time trend, which might be present in the 2^k sequentially generated responses. The article gives for each $2^{n-(n-k)}$ design: (i) the defining contrast displaying the designs alias structure (ii) the k independent generators for sequencing the designs $2^{n-(n-k)}$ runs by the Generalized Foldover Scheme and (ii) the minimum total cost of factor level changes between the $2^{n-(n-k)}$ runs of the design. Proposed designs compete well and sometimes better than existing systematic $2^{n-(n-k)}$ designs (of either resolution) both in minimizing the experimental cost of factor level changes and in securing factors resistance to the non-negligible time trend.

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Predicting Bitcoin Volatility via Gramian Angular Fields and Deep Learning

Oğuzhan Güler[1], Ömer Akgüller [1] and Mehmet Ali Balcı[1]

[1] Department of Mathematics, Muğla Sıtkı Koçman University, Muğla, Turkey

oguzhanguleer@mu.edu.tr, oakguller@mu.edu.tr, mehmetalibalci@mu.edu.tr

key-words: Gramian angular fields, LeNet, time series prediction.

Abstract:
Studying the volatility of crypto digital currency prices is becoming increasingly important for several reasons, including the difficulty of mining, the openness of the markets to speculation, their popularity, the price of alternative coins, stock markets, emotions, and certain legal grounds [1, 2]. In this study, we employ a deep learning-based method for forecasting Bitcoin's price volatility. The images obtained by using Gramian Angular Fields [3] from the Bitcoin price time series are fed into a convolutional neural network, where they were labeled according to a temporal association between each data point. A prediction at the ensuing volatility has been performed with accuracy of 97.1

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A Note On Spherical Fuzzy Topological Spaces

Süleyman Güler

Department of Mathematics, Faculty of Science, Aydin Adnan Menderes University, Aydin, Turkiye

sguler@adu.edu.tr

key-words: Spherical fuzzy set, spherical fuzzy topological space, spherical fuzzy continuity.

Abstract:
In spherical fuzzy sets the squared sum of membership, nonmembership and hesistancy degrees should be between 0 and 1. We generalize this structure by expanding the domain of picture fuzzy sets and Phthagorean fuzzy sets.
The concept of spherical fuzzy set (shortly SFS), which has various applications such as data mining, machine learning and quantum gravity, has been studied by many mathematicians. In this study, we define fuzzy topological space as an extension of Phthagorean topological space. Then we investigate some basic properties and prove theorems regarding this new concept.

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Fixed Point Theorems in Orthogonal Metric Spaces Via w-Distances

Nurcan Bilgili Gungor

Department of Mathematics, Amasya University, Amasya, Türkiye

nurcan.bilgili@amasya.edu.tr

key-words: Fixed point, altering distance functions, w-distance, orthogonal metric space, orthogonal p-contraction.

Abstract:
In 2017 (see [5]) , orthogonal set and orthogonal metric spaces are presented by establishing a perpendicular relation on a set. And an extension of Banach fixed point theorem is proved in this type metric spaces. Then in 2018 (see [11]), orthogonal lower semicontinuity and w-distance functions on orthogonal metric spaces are defined, also an actual generalization of Banach's fixed point theorem is presented via w-distances. Further in 2019 (see [2]), fixed point theorems are given on orthogonal metric spaces by using altering distance functions. In this work, presence and uniqueness of fixed points of the generalizations of orthogonal $p-$contraction by using altering distance functions are presented.

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Kantorovich Operators of Order j Based on Pòlya Distribution

Vijay Gupta

Department of Mathematics, Netaji Subhas University of Technology, New Delhi, India

vijaygupta2001@hotmail.com

key-words: Pòya distribution, finite differences, backward difference operator, Kantorovich type integral variant.

Abstract:
The present article is a study on higher order Kantorovich variant, which are connected with Pòlya distribution. We provide some direct estimates for the higher order ($j-th$ order) Kantorovich type integral operators.

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Non-linear Elliptic Unilateral Problems and L^1 Data in Orlicz Spaces Having Two Lower-order Terms

H. Farjil[1], I. Haddani[1], S.M. Douiri[1], M. Moumni[1] and M. Ait Khellou[2]

[1] Laboratory MAIS, Department of Mathematics, Faculty of Sciences and Techniques, Moulay Ismail, University of Meknes, P.O.Box 509 Boutalamine, Errachidia 52000, Morocco
[2] MIA Group, Department of Sciences, Higher Normal School, Moulay Ismail University of Meknes, P.O.Box 3104, Toulal, Meknes 50000, Morocco

hindfarjil@gmail.com, haddaniismail050@gmail.com, douiri.s.m@gmail.com, md.moumni@gmail.com, maitkhellou@gmail.com

key-words: Lower order term, Orlicz-Sobolev spaces, Non-linear elliptic unilateral problems

Abstract:

In this paper, we study the existence of solution for strongly unilateral problems associated to the non-linear elliptic with two lower -order terms in Orlicz spaces with L^1 data like the form

$$A(u) + g(x, u, \nabla u) + H(x, \nabla u) = f, \tag{14}$$

where A is Leray-Lions operator acting from $W_0^1 L_M(\Omega)$ to its dual, and the non-linear term $g(x, s, \xi)$ is assuming verified the growth condition on ξ, and a sign condition on s. The function $H(x, \xi)$ is only growing at most as $\overline{M}^{-1} M(|\nabla u|)$.

Equations examples:

(a) $-\operatorname{div}\left(\frac{\exp(|\nabla u|)-1}{|\nabla u|^2}\nabla u\right) + u\exp(|\nabla u|) = f,$

(b) $-\operatorname{div}\left(\exp\left(|\nabla u|^2\right)\nabla u\right) + u^3\exp\left(|\nabla u|^2 - u\right)|\nabla u|^2 = f,$

(c) $-\operatorname{div}\left(\exp(m|u|)\frac{\exp(|\nabla u|)}{|\nabla u|^2}\nabla u\right) + u\sin^2 u\exp(|\nabla u|) = f, \quad m \geq 0$, with $f \in L^1(\Omega)$.

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p-Adic Multiframelets and its Dual

Debasis Haldar[1], Animesh Bhandari[2]

[1] Department of Mathematics, NIT Rourkela, Rourkela, India
[2] School of Advanced Sciences and Languages, VIT Bhopal University, Bhopal, India

debamath.haldar@gmail.com, bhandari.animesh@gmail.com

key-words: p-adic, Besselet, multiframelet, multiframelet operator.

Abstract:
We will present p-adic multiframelets and its dual which are build upon p-adic wavelet construction. Various properties of multiframelet sequences in $L^2(\mathbb{Q}_p)$ will be analyzed. Moreover, multiframelets in $\mathbb{Q}_p$ through several properties of associated multiframelet operators and effect of bounded linear operators on multiframelets will be discussed. Furthermore, we will give characterization of multiframelets by erasure and Paley-Wiener type perturbation.

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Spatial Risk Estimation in Tweedie Compound Poisson Double Feneralized Linear Models

Aritra Halder[1], Shariq Mohammed[2], Kun Chen[3] and Dipak K. Dey[3]

[1] Department of Biostatistics, Drexel University, Philadelphia, Pennsylvania, United States of America
[2] Department of Biostatistics, Boston University, Boston, Massachusetts, United States of America
[3]Department of Statistics, University of Connecticut, Storrs, Connecticut, United States of America

aritra.halder@drexel.edu, shariqm@bu.edu, kun.chen@uconn.edu, dipak.dey@uconn.edu

key-words: Double generalized linear model, graph Laplacian, majorization descent.

Abstract:
The Tweedie exponential dispersion family [1] constitutes a fairly rich sub-class of the exponential family. In particular, a member, compound Poisson-gamma (CP-g) model [2] has seen extensive use over the past decade for modeling mixed response featuring exact zeros coupled with a continuous gamma tail. This paper proposes a framework to perform residual analysis on CP-g double generalized linear models for spatial uncertainty quantification [3]. Approximations are introduced to the proposed framework to make the procedure scalable, without compromise in accuracy of estimation and model complexity. Proposed framework is applied to quantifying spatial uncertainty in insurance loss costs arising from automobile collision coverage. Scalability is demonstrated by choosing sizable spatial reference domains comprised of groups of states within the United States of America.

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A Modified Leslie-Gower Predator-prey Mathematical Model with Fear Effect on Prey

Susmita Halder[1], Joydeb Bhattacharyya[2] and Samares Pal[2]

[1] Department of Mathematics, University of Kalyani, Nadia, India
[2] Department of Mathematics, Karimpur Pannadevi College, Nadia, India

sumimath.halder@gmail.com, b.joydeb@gmail.com, samaresp@gmail.com

key-words: predator-prey model, fear effect, harvesting.

Abstract:
In this article, we propose a modified Leslie-Gower predator-prey model with linear, Holling type II and Holling type III foraging strategies of the generalist predator with the predator induced fear effect on prey. We also have considered density-dependent harvesting for both prey and predator population. We investigate the dynamical behavior of the system analytically as well as numerically from the viewpoint of stability and bifurcations. We observe that the systems with linear and Holling type III foraging exhibit transcritical bifurcation, whereas the system with Holling type II foraging has a much more intricate dynamics with transcritical, saddle-node and Hopf bifurcations. It is observed that the prey population in the system with Holling type III foraging of the predator gets severely affected by the predation-driven fear effect in comparison with linear and Holling type II foraging rates of the predator.

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Finite Volume Relaxation Method for Hyperbolic Systems of Multiphase Flows

Fatima Harbate[1], Nouh Izem[1] and Mohammed Seaid[2]

[1] Department of mathematics, Ibn Zohr University, Agadir, Morocco
[2] Department of Engineering, Durham University, South Road Durham, United Kingdom

fatima.harbate@edu.uiz.ma, n.izem@uiz.ac.ma, m.seaid@durham.ac.ma

key-words: Relaxation methods, two-phase flows, Runge-Kutta methods.

Abstract:
A class of high-order finite volume Relaxation methods are proposed for numerical solution of hyperbolic systems of conservations laws. The proposed relaxation method transforms the nonlinear hyperbolic system to a semilinear model with a relaxation source terms and linear characteristics which can be numerically solved without using either riemann solvers or linear iterations. To discretize the relaxation system we consider a high resolution reconstruction in space and a TVD Runge-Kutta scheme for time integration. The method is applied to several problems of two-phase flows and a comparative study of different finite volume methods is presented. The numerical results demonstrate high resolution of the proposed relaxation methods and confirm their capability to provide accurate simulations for flow regimes with strong shocks.

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Iterative Approximation of a Common Solution of a Split Equilibrium Problem and a Fixed Point Problem in a Hilbert Space

Ihssane Hay

MAISI, Ibn Zohr University, Agadir, Morocco

ihssane.hay@gmail.com

key-words: Split equilibrium problem, fixed point problem.

Abstract:
The main objective of this paper is to introduce and study a new iterative method for solving a split equilibrium problem defined below by 15 and 16 and fixed point of a finite family of nonexpansive mapping in a real Hilbert space. Under some suitable assumptions, we prove the strong convergence of our method presented in this paper to the common element of the solution set of split equilibrium problems and the set of fixed points problems in the setting of Hilbert spaces. Moreover we give a numerical example to illustrate the efficiency of our proposed iterative method. See references [1], [2] and [3].

The Split Equilibrium Problem Formulating:
Let H is a real Hilbert space, C and Q be nonempty closed convex subsets of H.
Let $F : C \times C \longrightarrow R$, and $G : Q \times Q \longrightarrow R$, be two bifonctions, and $A : H \longrightarrow H$ be a finite family of bounded linear operators, The split equilibrium problem is as follows:

$$\begin{cases} \text{Find} \quad x^* \in C \\ F(x^*, x) \geq 0, \quad \forall x \in C, \end{cases} \tag{15}$$

and

$$\begin{cases} \text{Find} \quad y^* = Ax^* \in Q \\ G(y^*, y) \geq 0, \quad \forall y \in Q. \end{cases} \tag{16}$$

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Chebyshev Polynomials of Second Kind to Approximate Nonlinear Singular Fredholm Integro-Differential Equations

Youcef Henka[1], Samir Lemita[2] and Mohamed Zine Aissaoui[1]

[1] Department of Mathematics, University of Guelma 08 May 1945, Guelma, Algeria
[2] Department of Mathematics, Ecole normale supérieure de Ouergla , Ouregla, Algeria

henka.youcef.henka@gmail.com
key-words: Fredholm integro-differential equation, Galerkin method, weakly singular kernel.

Abstract:
In the present work, we examine a numerical study for nonlinear Fredholm integro differential equations with the weakly singular kernel which have the following form

$$\begin{cases} \beta(x) = f(x) + \displaystyle\int_a^b p(|x-s|)\Psi(x,s,\beta(s),\beta'(s))ds,\ x \in [a,b], \\ \beta(0) = \rho, \end{cases} \tag{17}$$

where,

$$\left\| \begin{array}{ll} (1) & p(s) \in W^{1,1}(0,b-a) \\ (2) & \lim_{s\to 0} +p'(s) = +\infty \end{array} \right.$$

$$W^{1,1}(0,b-a) = p \in L^1(0,b-a) : p' \in L^1(0,b-a)$$

and

$$\beta(x), f(x) \in C^1([a,b],R), \quad \frac{\partial \Psi}{\partial t} \in C^0\left([a,b]^2 \times R^2\right).$$

We propose a new method to deal with the singularity of the function $p'(s)$, the numerical solution is given by applying the Galerkin method and using Chebyshev polynomials of the second kind, we show the effectiveness and accuracy of the proposed method through several illustrative examples.

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On Some Well-posedness Issues of the Inviscid Burgers Equation on Sobolev Spaces

Hasan İnci

Department of Mathematics, Koç University, İstanbul, Türkiye

hinci@ku.edu.tr

key-words: Inviscid burgers equation, well-posedness.

Abstract:
In this paper we consider for $n \geq 1$ the n dimensional inviscid Burgers equation on the Sobolev space $H^s(\mathbb{R}^n)$, $s > n/2 + 1$. In Lagrangian coordinates the Burgers equation is "linear". We will use this simple structure of the Burgers equation to study some well-posedness issues for classical solutions. The Burgers equation is locally well-posed in $H^s(\mathbb{R}^n)$ in the "classical" regime $s > n/2 + 1$. We will show that its solution map, mapping the initial value to the corresponding solution, cannot be continuously extended to $H^{s_c}(\mathbb{R}^n)$ for the borderline case $s_c = n/2+1$. We will further show that the solution map is nowhere locally uniformly continuous in the classical regime $s > n/2 + 1$. We will also show that there are always solutions which blow up in finite time. The purpose of this paper is to give some new results, improve known results and to illustrate a Lagrangian approach in the simple setting of the Burgers equation which can be applied to more complicated equations like the incompressible Euler equations.

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On the Prekernels of Reflective Modifications of Concrete Categories

Federico Giovanni Infusino

Department of Mathematics and Computer Sciences (DeMaCS), University of Calabria, Rende (CS), Italy

f.infusino@mat.unical.it

key-words: Proper Moore-Concrete Subcategories, prekernels, Pretorsion theories.

Abstract:
In this talk we focus our attention on the notion of *prekernel*, recently introduced in order to generalize the context of categorical homological theory. More in detail, we aim at studying the main properties of prekernels (and dually of *precokernels*) of reflective modifications of a concrete category $\mathcal{C}$.

We will also see how to induce a *pretorsion theory* on a reflective modification starting from any given pretorsion theory defined on the ambient category $\mathcal{C}$. Finally, we characterize the prekernels in any functor-structured category and, in the specific case of set-functor structured categories, we also get a correspondence between prekernels and the kernels of a suitable quotient category and, similarly, between precokernels and weak cokernels of the same quotient category.

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Blow-up Result of Solutions for Hyperbolic Type Equations with Degenerate Viscoleastic and Logarithmic Source erm

Nazlı Irkıl

Institute of Sciences, Dicle University, Diyarbakır, Turkey

nazliirkil@gmail.com

key-words: Blow up, degenerate, logarithmic source term.

Abstract:
In this presentation, we established blow up results for the initial boundary value problem of hyperbolic type equation with degenerate viscoelastic and logarithmic source term and nonlinear damping term. In the absence of logarithmic source term mathematicians studied hyperbolic type equations with degenerate viscoelastic term (see [2, 3, 5, 8]). The wave equation with logarithmic source term which is related with different branches of physics was discussed in last time. Wave equation with logarithmic source term is an effective area for mathematicians and there is a widely literature, for examples (see [1, 4, 6, 7]). As far as know, there is not enough study about hyperbolic type equation with degenerate viscoelastic and logarithmic source term. We study blow up results result by using concavity method. This work generalizes and earlier results in literature.

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Emphasising the Mortality Path for Adulthood and Senescent Period Using Mathematical Growth Models

Begüm Çığar[1], Deniz Ünal[1] and Neslihan Iyit[2]

[1] Department of Statistics, Çukurova University, Adana, Turkey
[2] Department of Statistics, Selcuk University, Konya, Turkey

dunal@cu.edu.tr, begumcigsar@cu.edu.tr, niyit@selcuk.edu.tr

key-words: Life tables, mathematical growth models, Exponential growth, Kannisto model, Gompertz function.

Abstract:
The tables giving the number of newborns and the number of individuals surviving in a community on years are called life tables. In other words, life tables are textures that record how many people survived and how many died in a year at each age. By understanding and modeling the structure of these tables, it is possible to make predictions about the future. For this purpose, mathematical mortality functions are used. The literal meaning of mortality is death and comes from the Latin root 'mortis' with the same meaning. In order to provide a better mathematical modeling of the life process (or to measure mortality) of the community, these functions can be arranged through parameters and the pattern of life can be determined more strongly. Using mathematical growth models for life tables may differ according to the countries, genders and different stages of life. For this reason, both the functions used and the parameters related to these functions may change. In this study, the necessity of expressing the mortality probabilities of adults and old age ones with different distributions is emphasized and the mathematical growth models obtained with this motivation are introduced. A distribution in the log-normal structure was used to calculate adult mortality rates by these models. Because, while modeling adult deaths, a curve of this nature may also include accidental situations and maternal deaths which are high risk factors for women. In addition, exponential growth model, Kannisto model and Gompertz function having exponential structure were used in the defined mathematical models. The common feature of these distributions is that they can model the increase in death rates for elders. In the second part of this study, the mortality probabilities of the functions were estimated with the age-based life table data of TUIK for the years 2017-2019. The reason for choosing these years is to target the use of death statistics unaffected by the Covid-19 Pandemic period. Finally, the fit of the predicted mathematical growth models are shown with graphics, and their performances are compared with the RMSE, MAPE and $adjR^2$ criteria.

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One Concave-Convex Inequality and its Consequences

Julije Jakšetić

Faculty of Food Technology and Biotechnology, University of Zagreb, Zagreb, Croatia
Section for Mathematics

jjaksetic@pbf.hr

key-words: Convex function, completely monotone functions, means, random variable.

Abstract:
Our starting point is an integral inequality, unsolved Problem 8, Jósef Wildt International Mathematical Competition, that involves convex, concave and monotonically increasing functions. We give some interpretations of the inequality, in terms of probability and in terms of linear functionals from which we further generate completely monotone functions and means. The later application is seen from perspective of monotonicity and convexity.

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Bi-symphonic Maps Between Riemannian Manifolds

Ahmed Mohammed Cherif[1], Zegga Kaddour[1]

[1] Mascara University, Faculty of Exact Sciences, Mascara, Algeria

a.mohammedcherif@univ-mascara.dz, zegga.kadour@univ-mascara.dz

key-words: Variational problem, Symphonic map, Bi-Symphonic map.

Abstract:
Let (M^m, g), (N^n, h) be Riemannian manifolds without boundary, (m=dim(M), n=dim(N)) and let φ be a smooth map from M into N. Let φ^*h be the pullback of the metric h by φ , i.e.,

$$(\varphi^*h)(X,Y) = h(d\varphi(X), d\varphi(Y))$$

for any vector fields X, Y on M. We consider the functional or the symphonic energy

$$\Phi(\varphi) = \int_M \|\varphi^*h\|^2 dv_g,$$

where dv_g is the volume form on (M, g), and $\|\varphi^*h\|$ denotes the norm of the pullback φ^*h, i.e.,

$$\|\varphi^*h\|^2 = \sum_{i,j=1}^{m} h(d\varphi(e_i), d\varphi(e_j))^2,$$

and $\{e_i\}$ is a local orthonormal frame on (M^m, g). The symphonic energy $\Phi(\varphi)$ is related to the energy $E(\varphi)$ in the theory of harmonic maps since the functional $\Phi(\varphi)$ is an integral of the norm of the pullback φ^*h. The first variation formula of the functional energy $\Phi(\varphi)$ was given by Shigeo Kawaia, Nobumitsu Nakauchi in [4]. they proved that

$$\frac{d\Phi(\varphi_t)}{dt}\Big|_{t=0} = -4\int_M h(\operatorname{div}_g \sigma_\varphi, v) dv_g,$$

for any variation vector field v, where

$$\begin{aligned}\operatorname{div}_g \sigma_\varphi &= \sum_{i,j=1}^{m} \Big\{ h(\nabla d\varphi(e_i, e_i), d\varphi(e_j)) d\varphi(e_j) + h(d\varphi(e_i), \nabla d\varphi(e_i, e_j)) d\varphi(e_j) \\ &+ h(d\varphi(e_i), d\varphi(e_j)) \nabla d\varphi(e_i, e_j) \Big\}.\end{aligned}$$

The map φ is called symphonic if and only if $\operatorname{div}_g \sigma_\varphi = 0$. In this paper, we extend the definition of symphonic maps $\varphi : (M, g) \longrightarrow (N, h)$ via the variation of the bi-energy functional related to the pullback metric φ^*h between two Riemannian manifolds.

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Béezier Baskakov-Durrmeyer Type Operators

Arun Kajla[1]

[1]Department of Mathematics, Central University of Haryana, Haryana, India

arunkajla@cuh.ac.in

key-words: Order of approximation, Baskakov operator.

Abstract:
In this study, we construct the Bézier variant of the generalized Baskakov-Durrmeyer type operators. We give a direct approximation theorem in terms of the Ditzian-Totik modulus of smoothness $\omega_{\varphi^\eta}(\zeta, s)(0 \leq \eta \leq 1)$ and the rate of convergence for functions having derivatives of bounded variation.

Weighted Hermite-Hadamard Inequalites via Steffensen's Inequality and Lidstone Interpolating Polynomial

Ksenija Smoljak Kalamir

Faculty of Textile Technology, University of Zagreb, Zagreb, Croatia

ksmoljak@ttf.hr

key-words: Lidstone interpolating polynomial, convex functions, generalizations, estimates.

Abstract:
One of the most interesting results relating to convexity is Hermite-Hadamard's inequality (see [1] and [2]). It gives us an estimate of the integral mean value of a continuous convex function. The weighted Hermite-Hadamard inequality for convex functions [6] and Steffensen's inequality [3, 7, 8] have been the starting point for many recent advances in the theory of inequalities. In this talk we will use the method presented in [5] on identities related to generalizations of Steffensen's inequality via Lidstone interpolating polynomial proved in [4] to obtain new weighted Hermite-Hadamard inequalities as well as some estimates for Steffensen-type differences.

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Peaks Over Threshold Estimation for Ergodic Distribution of a Semi-Markovian Inventory Model

Aslı Bektaş Kamışlık

Department of Mathematics, Recep Tayyip Erdoğan University, Rize, Turkey

asli.bektas@erdogan.edu.tr
key-words: Extreme value theory, POT based estimation, semi-Markovian inventory model.

Abstract:
In this study, we aim to use the basic principles of extreme value theory to provide an estimator for ergodic distribution of the stochastic process X(t) which represents a semi Markovian inventory model of type (s,S). For this purpose, POT (Peaks Over Threshold) based estimation investigated for renewal function. A stochastic process which express a semi Markovian inventory model of type (s,S) with heavy tailed demand quantities is constructed mathematically and exact formula for ergodic distribution of this process is provided. More specifically we consider that demand random variables are regularly varying with infinite variance where survival function has following form:

$$\bar{F}(x) = cx^{-1/\xi}\left(1 + x^{-\delta}L(x)\right) \tag{18}$$

for $\xi \in (0,1)$, $\delta > 0$ and some real constant $c > 0$, with $L(x)$ is slowly varying function at infinity. We used well known results of POT based estimation (see for example [1], [2], [4]) for renewal function in order to propose new estimator for ergodic distribution function of the process X(t). Finally we show that the proposed estimator is consistent and asymptotically unbiased.

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Some Special Vector Fields on a Tangent Bundle with a Ricci Quarter-symmetric Metric Connection

Aydın Gezer, Erkan Karakaş

Department of Mathematics, Atatürk University, Erzurum, Türkiye

aydingzr@gmail.com, erkanberatkarakas@gmail.com

key-words: Complete lift metric, Ricci quarter-symmetric metric connection, tangent bundle, vector field.

Abstract:
Let TM be the tangent bundle of a (pseudo-)Riemannian manifold M with a Ricci quarter-symmetric metric connection $\overline{\nabla}$. This paper classifies some special vector fields, such as incompressible vector fields, harmonic vector fields, concurrent vector fields, conformal vector fields, projective vector fields and $\widetilde{\varphi}(Ric)$ vector fields on TM according to the Ricci quarter-symmetric metric connection $\overline{\nabla}$.

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Neimark-Sacker Bifurcation Analysis in a Population Model

Hatice Karakaya[1], Şenol Kartal[2]

[1] Erciyes University, Department of Mathematics, Kayseri, Türkiye
[2] Nevşehir Hacı Bektaş Veli University, Department of Science and Mathematics Education, Nevsehir, Türkiye

htc_karakaya38@hotmail.com, senol.kartal@nevsehir.edu.tr

key-words: Piecewise constant arguments, difference equation, stability, Neimark-Sacker bifurcation, network dynamics

Abstract:
In this paper, we present a mathematical model which consists of system of differential equations with piecewise constant arguments for the dynamics of early stage brain tumor. The discretization process of a differential equation with piecewise constant arguments gives us two dimensional discrete dynamical system. In discrete model, we analyze the stability of the equilibrium points and prove the existence of Neimark-Sacker bifurcation depending on the parameter tumor growth parameter r. It has been observed that periodic behaviors occur in the tumor population as a result of Neimark-Sacker bifurcation. Finally, the existence of chaotic behavior in the system is investigated by calculating Lyapunov exponents. All these results are supported by numerical simulations.

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Complex dynamics of a discrete-time predator-prey system with Holling IV functional response, *Chaos. Soliton. Fract., 87, 158-171.*

Unit Generalized Marshall-Olkin Weibull Distribution: Properties and Application

Kadir Karakaya

Department of Statistics, Faculty of Science, Selçuk University, Konya, Turkey

kkarakaya@selcuk.edu.tr

key-words: Marshall-Olkin family, unit distribution, Monte Carlo simulation.

Abstract:
In this study, a new unit distribution is introduced. The generalized Marshall-Olkin Weibull distribution is considered a baseline distribution. The new distribution is called the unit generalized Marshall-Olkin Weibull distribution. Some mathematical properties of the new model are discussed. Some estimation methods for four parameters of the model are examined. Also, an extensive Monte Carlo simulation study is conducted to observe the performance of the estimators. A practical data set is provided to demonstrate the efficiency of the new unit distribution.

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Schouten Connection in Transversal Lightlike Submersions

Cumali Yıldırım[1], Esra Karataş[2]

[1] Department of Mathematics, Inonu University, Malatya, Turkey
[2] Department of Mathematics, Inonu University, Malatya, Turkey

cumali.yildirim@inonu.edu.tr, esrakrts4422@gmail.com

key-words: Semi-Riemannian manifold, Transversal lightlike submersion, Schouten connection.

Abstract:
In this paper, we examine Schouten connection, which was introduced in Riemannian submersions before, for transversal lightlike submersions. In addition, we find various equations according to the T and A fundamental tensor field and give some results about whether the Schouten connection is a metric connection or not.

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Dynamics of a Star Network in Discrete Fractional Order Biological Model

Neriman Kartal

Department of Mathematics, Nevşehir Hacı Bektaş Veli University, Nevşehir, Turkey

nerimangok@nevsehir.edu.tr

key-words: Piecewise constant arguments, difference equation, stability, Neimark-Sacker bifurcation, network dynamics

Abstract:
In this paper we study the predator-prey model with piecewise constant arguments under the fractional order derivative in Conformable sense. The discretization process of the conformable fractional order model with piecewise constant arguments gives us two dimensional discrete dynamical system in the sub-intervals. We find the all of the equilibrium points of the discrete dynamical system and determine algebraic conditions to ensure the asymptotic stability of the equilibrium points. By using the center manifold theory we show that flip and Neimark-Sacker bifurcations occur in the discrete dynamical system. Dynamic structures of the system are also studied in a star network. Similar dynamical behaviours can be observed on this coupled network. Numerical simulations show that coupling strength parameter plays a key role on the dynamics of the network. All theoretical results are supported by numerical simulations and interpreted biologically.

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A Generalization of the Durrmeyer-variant of Lototsky-Bernstein Operators

Jaspreet Kaur[1], Meenu Goya[1]

[1] Thapar Institute of Engineering and Technology, Patiala, India

jazzbagri3@gmail.com, meenu_rani@thapar.edu

key-words: Baskakov operators, Korovkin-type approximation theorem, rate of convergence, modulus of continuity.

Abstract:
In the present note, we give the generalization of $\alpha-$Baskakov Durrmeyer operators depending on a real parameter $\rho > 0$. We present the approximation results in Korovkin and weighted Korovkin spaces. We also prove the order of approximation, rate of approximation for these operators. In the end, we verify our results with the help of numerical examples by using Mathematica.

Random Generation Problem in the Substitution Group of Formal Power Series

Tuğba Aslan Khalifa

Management and Information Systems, Istanbul Medipol University, Istanbul, Turkey

tugba.aslankhalifa@medipol.edu.tr

key-words: Nottingham Group, pro-p groups, random generation.

Abstract:
We consider the group, $\mathcal{N}$, of formal power series with leading term x, under formal substitution over a finite field of prime characteristic. This group is known as the Nottingham group. Admitting that $\mathcal{N}$ has a significant role in both number theory and group theory, we are rather interested in $\mathcal{N}$ as a crucial example of a pro-p group. It, actually, gained its group theoretic interest after the result of R. Camina, [2]: Every finitely generated pro-p group can be embedded into the Nottingham group. Following Camina's result, $\mathcal{N}$ was heavily investigated by many group theorists, see e.g., [3], [4], [5].

Every pro-p group can be viewed as a probabilistic space with respect to the normalized Haar Measure. Due to this probabilistic nature of pro-p groups, there has been a growing interest to probabilistic questions in group theory during the last 30 years, in particular to random generation problems, see e.g., [1], [5]. In this talk, we will consider $\mathcal{N}$ as a probabilistic space with respect to its normalized Haar Measure and we will prove that "**The probability that two randomly chosen elements from $\mathcal{N}$ generates a subgroup, where every element has depth divisible by p, is zero.**". In our proof, we use some extended properties of Engel words in $\mathcal{N}$ that may seem interesting in their own.

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h-stabilization of Perturber Time-varying Nonlinear Systems

Abir Kicha[1], Hanen Damak[2] and Mohamed Ali Hammami[2]

[1] Department of Mathematics, University of Jijel, Jijel, Algeria
[2] Department of Mathematics, University of Sfax, Sfax, Tunisia

kichaabir05@gmail.com

key-words: h-stabilization, perturbed systems, Lyapunov's theory.

Abstract:
The main purpose of developing stability theory is to examine the dynamic responses of a system to disturbances as time approaches infinity. It has been and still is the subject of intense investigations due to its intrinsic interest and its relevance to all practical systems in engineering, natural science and social science. To study the stability of nonlinear differential systems we generally refer to the results introduced by Lyapunov in 1892, which is called: Lyapunovs second method. It is one of the most well known techniques for studying the stability properties of dynamic systems. This method uses an auxiliary function, called Lyapunov function, which checks the stability behavior of a specific system without the need to generate system solutions. In this work, we concern with practical problems, especially problems from the area of controls, such a concept called practical h-stability. We investigated the global uniform h-stabilization for certain classes of nonlinear time-varying systems and we proved that the proposed controller guarantees the global uniform h-stability of the closed-loop system. The technique is based on the Lyapunov theory. We illustrated the applicability of the obtained results by numerical examples with simulations. Our original results generalize well known fundamental results: exponential stabilization for nonlinear time-varying systems.

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Classification of Eye Diseases Based on Retinal Images Using Deep Learning

Ismail Hakkı Kınalıoğlu

Department of Actuarial Science, Selçuk University, 42250 Konya, Turkey

ismailhakkikinali@gmail.com

key-words: Classification, deep learning, disease diagnosis, eye disease diagnosis.

Abstract:
Deep learning networks are widely used in many fields due to their classification capabilities. One of these fields is Medicine. Especially with the effect of developing medical imaging techniques, deep learning networks are used in the diagnosis of many diseases. In this study, deep learning networks are used to diagnose Diabetic Retinopathy, Cataract and Glaucoma, some of the most common eye diseases among the public. Retinal images of people with this diseases are collected from various online databases. Classification is made with deep learning networks using approximately 5000 retinal images. At the end of the classification, a success of 93.84% is achieved

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On the Oscillation of Discrete Time Switched Linear Systems

Gülnur Çelik Kızılkan[1], Ahmet Duman[1] and Kemal Aydın[2]

[1] Department of Mathematics Computer, Necmettin Erbakan University, Konya, Türkiye
[2] Department of Mathematics, Selçuk University, Konya, Türkiye

gckizilkan@erbakan.edu.tr, aduman@erbakan.edu.tr, kaydin@selcuk.edu.tr

key-words: Switched systems, dwell time, Schur stability, Hurwitz stability, stability parameter, oscillation.

Abstract:
Switched systems, encountered in many real-life problems, are dynamic systems consisting of a finite family of systems and a rule that provides transitions among these subsystems [1]. For this reason, there are many studies examining the behavior of switched systems in the literature (for example, [1]- [3]). The most of these studies are based on the eigenvalues. Therefore, methods based on stability parameter for dwell time have been developed in [2]-[3]. Another issue as important as the study of the stability of switched systems is the study of their oscillation [4]. In this study, we have considered the following discrete- time switched system:

$$x(t+1) = A_{\sigma(t)}x(t), t \in \mathbf{N} \tag{19}$$

where $x(t) \in \mathbf{C}^N$, $A_p \in \mathbf{C}^{N\times N}$ are constant matrices, $p \in \mathcal{P}$, $\mathcal{P}$ is index set and $\sigma : \mathbf{N} \to \mathcal{P}$ is switching signal. We investigated the dwell time for system (19) to be both Schur stable and oscillating. We have used the condition number to determine dwell time. For condition number, see [2]- [3]. We have presented our results with numerical examples.

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On the Notion of Sobriety in the Setting of Diframes

Esra Korkmaz

Department of Mathematics, Hacettepe University, Ankara, Turkey

esrakaratas@hacettepe.edu.tr

key-words: Point-free topology, diframe, sobriety.

Abstract:
Sobriety is a concept that is of great interest to scholars studying point-free topology. The reason is that sober spaces can be reconstructed from their lattices of open sets [1]. This construction is a key to the door between classical and point-free topology. M. Erné [2] claims that sobriety must be defined in a point-free setting to obtain a suitable generalization. Burdick [3] defined the notion of sobriety for bitopological spaces. Taking Burdick's work as a starting point, we presented the concept of soberness in diframes. Further, we studied the interplay between sobriety and some other diframe-theoretical concepts.

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Unbounded Quasi-normed Convergence in Quasi-normed Lattices and Some Property of L_p Spaces for $0 < p < 1$

Enkeleda Zajmi Kotonaj

Department of Mathematics, University of Tirana,Tirana, Albania

enkeleida.kallushi@fshn.edu.al

key-words: unbounded quasi-normed convergence, quasi-normed lattices, L_p spaces.

Abstract:
The unbounded norm convergence was first defined by V. Troitsky (2004) in [9] under the name d convergence. The name unbounded norm convergence was introduced by Y. Deng, M. OBrien and V. Troitsky (2017) in [10], where they studied basic properties of unbounded norm convergence.
In this paper, the initial purpose is to extend the concept of unbounded convergence in quasi-normed spaces which is named unbounded quasi - norm convergence and to study some of basic properties of unbounded quasi-normed convergence in quasi-normed lattices. In assuming that (X, Σ, μ) is finite measurable space, we will discuss also some properties of L_p spaces for $0 < p < 1$ where most important results are the generalizations of dominated convergence theorem and Brézis - Lieb lemma.

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A Revisit to Some Generalized Functions Used in Applied Analysis and Astrophysics

Dilip Kumar

Department of Mathematics, University of Kerala, Kerala, India

dilipkumar@keralauniversity.ac.in

key-words: Thermonuclear function, Krätzel function, pathway model, G-function, Mellin Transform, H-function.

Abstract:
The paper is devoted to the retrospection of some generalized integrals in Applied analysis namely Krätzel function [1] and thermonuclear functions [2, 3, 9] in Astrophysics. The generalization are done by means of a statistical model called pathway model[8] which covers the Tsallis' non-extensive statistical mechanics[11, 12]. The generalized functions are represented in terms of special functions like G-function and H-function[4, 5, 6, 7, 10]. Comparison with standard cases are studied. Scope of further research in these area are also pointed out.

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Some Results of Generalized Kantorovich Exponential Sampling Series in Logarithmic Weighted Spaces

Sadettin Kursun

Department of Mathematics, Selcuk University, Selcuklu, Türkiye

sadettinkursun@yahoo.com

key-words: Generalized Kantorovich forms of exponential sampling series, logarithmic weighted spaces, logarithmic modulus of continuity.

Abstract:
The present paper is a continuation of the recent paper "A. Aral, T. Acar, S. Kursun, Generalized Kantorovich forms of exponential sampling series, Anal. Math. Pyh., 12:50, 1-19 (2022)" in which a new Kantorovich form of generalized exponential sampling series has been introduced by means of Mellin Gauss Weierstrass singular integrals. In this paper, in order to investigate pointwise convergence of the family of this operators, we first obtain an estimate for the remainder of Mellin-Taylor's formula and by this estimate we give the Voronovskaya theorem in quantitative form by means of Mellin derivatives. Furthermore, we present quantitative Voronovskaya theorem for difference of family of this operators and generalized exponential sampling series. The results are examined by illustrative numerical examples.

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Existence of Solutions of Nicholson's Blowflies Differential Equations with Conformable Derivative

A. Guezane-Lakoud[1], M. Ladjimi[1] and R. Khalil[2]

[1] Department of Mathematics,Laboratory of Advanced Materials, Faculty of Sciences, University Badji Mokhtar-Annaba. Algeria
[2] Department of Mathematics, The university of Jordan, Amman, Jordan

`meriemladjimi70@gmail.com, a_guezane@yahoo.fr, roshdi@ju.edu.jo`

key-words: Nicholson's blowflies differential equation, Conformable derivative, Existence of solution, Uniqueness of solution.

Abstract:
The well-known Nicholson's blowflies differential equation is an important biological model that appeared in the 1950s with Nicholson's experiments on the sheep blowflies. Our main purpose is to study the existence and uniqueness of nonnegative solutions for Nicholson's blowflies differential equation with conformable derivative on the half-line using Leray-Schauder nonlinear alternative theorem and contraction mappinjg princilpe. Moreover, an example with its numerical simulations is given to illustrate the feasibility of the theoretical findings

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Standard M/G/1 Queue with Preemptive Repeat Priority and Lose of Lower Priority Demands

Boutarfa Leila

Laboratory of Analysis and control of Differential Equations "ACED", Fac. MISM, Dept. Maths, Univ. 8 May 1945, Guelma, Algeria

leila.bout@gmail.com

key-words: Queue, Preemptive repeat priority, Embedded Markov chain, Ergodicity condition, Steady-state distribution.

Abstract:
The queuing systems can be classified into two categories according to the number of different calls: models with a single type of calls and models with several types of call (multi-class priority queues). The phenomenon of priority exists in various real applications. For this fact, a large attention was given to queuing systems with priority in the literature [1],[2],[3]... . There are two disciplines for treating the priority demand. The non-preemptive discipline lets the lower priority demand completes service unlike the preemptive discipline which retires it from service. In this work, we consider a classical M/G/1 queue system with preemptive repeat priority and two types of customers.In this System, any customer finding the server free immediately occupies the server and leaves the system after service completion. Any high priority customer finding the server occupied by the service of another high priority customer, take place in an infinite waiting line. A low priority customer finding the server occupied by the service of any type of customer lives the system. high priority customers have a preemptive priority over low priority customers. low priority customer whose service was interrupted by the arriving of high priority customers persists in the service station until the completion of high priority customers service to repeat immediately his service again. For model under consideration, we give the generating function of steady-state distribution of the number of customers, by using the embedded Markov chain technique. This model can be used to model some information desks where a single agent receives urgent faxes and answers the present customer .

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Spider's Web Structure on Quite Fast Escaping Set

Soumyadip Majee[1], Subham Chatterjee[1] and Gorachand Chakraborty[1]

[1] Department of mathematics, Sidho-Kanho-Birsha university, Purulia, West Bengal, India

soumyadipmajee1998@gmail.com, subham.acad.res@gmail.com, gorachand11@gmail.com

key-words: Transcendental entire function, Escaping set, Quite fast escaping set, Spider's web.

Abstract:
Let f be a transcendental entire function. In this article, our main focus is to find out spider's web structure in quite fast escaping set. We define different levels of the set $Q_\epsilon(f)$ which is a subset of quite fast escaping set. Then we prove some relations between the levels of $Q_\epsilon(f)$. We show that every component of $Q_\epsilon(f)$ is unbounded. Finally, we give some conditions about the existence of spider's web structure in $Q_{\epsilon,R}(f)$ (0^{th} level of $Q_\epsilon(f)$), $Q_\epsilon(f)$, quite fast escaping set and escaping set.

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Mathematical Analysis of an Optimal Control Problem for a Generalized Reaction-Diffusion System Arising in Epidemiology

Mohamed Mehdaoui[1], Abdesslem Lamrani Alaoui[1] and Mouhcine Tilioua[1]

[1] Moulay Ismail University of Meknes, FST Errachidia, MAIS Laboratory, MAMCS Group, P.O. Box 509, Boutalamine 52000, Errachidia, Morocco

m.mehdaoui@edu.umi.ac.ma, abdesslemalaoui@gmail.com, m.tilioua@umi.ac.ma

key-words: Partial differential equations, optimal control, numerical simulations.

Abstract:
This work is concerned with the problem of finding the possible optimal control vaccination and treatment strategies for infectious diseases propagating disparately within populations, by addressing an optimal control problem for a generalized spatio-temporal multi-group epidemic model of type SIR. First, the biological and mathematical well-posedness of the model, for fixed controls, are proved by using semigroup theory and a truncation technique. Then, first order necessary optimality conditions are derived by means of the adjoint-state method. At last, numerical simulations incorporating different scenarios are performed.

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On Some Diffusion Problems with Interfaces and Concrete Applications

Abdallah Menad[1], Ahmed Medeghri[2] and Rabah Labbas [3]

[1] Department of Mathematics, Ibn Badis University, Mostagenem, Algeria
[2] Department of Mathematics, Abdelhamid Ibn Badis University, Mostagenem, Algeria
[3] Department of Mathematics, Havre University, Havre, French

abellah.menad@univ-mosta.dz, ahmed.medeghri@univ-mosta.dz , abellah.menad@univ-mosta.dz

key-words: Population dynamics, Habitat type, Skew brownian motion, Diffusion equation,Buffer zones, Semigroups.

Abstract:
In this work we study an elliptic differential equation set in three habitats with skewness boundary conditions at the interfaces. It represents the linear stationary case of dispersal problems of population dynamics which incorporate responses at interfaces between the habitats. Existence, uniqueness and regularity of the solution of these problems are obtained in Hölder spaces under necessary and sufficient conditions on the data. Our techniques are based on the semigroup theory, the fractional powers of linear operators, the H^∞ functional calculus for sectorial operators in Banach spaces and some properties of real interpolation spaces. Deadline for submission of abstracts is April 20, 2021 .
The goal of this work [3] is to study a problem of diffusion with interfaces coming from (concrete) situations in population dynamics [2].

In stationary mode this problem is reduced to an operational form of the type:

$$(P1A)\begin{cases} \text{(Equats)} \quad u''(x)+Au(x)=G(x) \ \text{ in } \ ]-l,0[\cup]0,2L[\cup]2L,2L+l[\\ \text{(Bounda C.)} \quad u_-(-l)=f_- \ , \ u_+(2L+l)=f_+ \\ \text{(Transmission. C.)} \quad u_-(0)=u_0(0) \ , \ u_0(2L)=u_+(2L) \\ \text{(Skewness C.)} \quad (1-p)du'_-(0)=pd_0u'_0(0), \ pd_0u'_0(2L)=(1-p)du'_+(2L). \end{cases}$$

The operator A verifies the following ellipticity hypothesis:

$$\rho(A)\supset[0,+\infty[\ \text{ et } \exists C>0:\forall\lambda\geq 0, \left\|(A-\lambda I)^{-1}\right\|_{L(E)}\leq\frac{C}{1+|\lambda|}.$$

Where $\rho(A)$ denotes the resolvent set of A.

Then operator $B:=-(-A)^{\frac{1}{2}}$ generates an analytic semigroup (see [1]) which makes possible to find a representation of the solution. The analysis of this representation allows us to find necessary and sufficient conditions on the data for existence, uniqueness and regularity.

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Asymptotic Expansions of the Archimedean Compounds

Tomislav Burić[1], Neven Elezović[1] and Lenka Mihoković[1]

[1] Department of Applied Mathematics, University of Zagreb, Faculty of Electrical Engineering and Computing, Zagreb, Croatia

tomislav.buric@fer.hr, neven@element.hr, lenka.mihokovic@fer.hr

key-words: Means, asymptotic expansions.

Abstract:

Iterative techniques have been used in various computational problems since the antics. As a continuation of Archimedes iterative method for finding the constant of a circle, today known as π, in the 19th century analytic procedures were formalized and the Pfaff-Schwab-Borchardt iterative algorithm has been studied. This algorithm can be generalized on two bivariate means M and N. By a bivariate mean we consider symmetrical function $M : \mathbf{R}_+ \times \mathbf{R}_+ \to \mathbf{R}_+$ such that

$$\min(x, y) \le M(x, y) \le \max(x, y). \tag{20}$$

Then, starting with $M_0 = x$, $N_0 = y$, we define an iterative algorithm:

$$M_{n+1} = M(M_n, N_n), \quad N_{n+1} = N(M_{n+1}, N_n), \quad n \ge 0. \tag{21}$$

For the computation of the mean N the updated value of mean M is used in contrast to a value from the previous iteration which is used in the known Gauss algorithm. If these two sequences converge to the same limit, we call it Archimedean compound and use notation $M \otimes_a N(x, y)$ ([1, 2]).

The compounds in a general setting rarely have a closed explicit form and therefore it is useful to find another way of representing these means. The asymptotic power series expansion of the mean $M(s, t)$ is a series representation such that for each $n' \in \mathbf{N}_0$ holds

$$M(x + s, x + t) = x \sum_{n=0}^{n'} c_n(s, t) x^{-n} + o(x^{-n'+1}), \quad x \to \infty, \tag{22}$$

where $c_n(s, t)$ are polynomials of the degree n in variables s and t.

In this paper we present a complete asymptotic expansion of the Archimedean compound of two symmetric homogeneous means and derive recursive algorithms for coefficients in this expansion. We also show some examples and obtain explicit expansions for the Archimedean compounds of the arithmetic, geometric and harmonic mean.

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On Cure Rate Modelling: Some Theoretical and Practical Aspects

F. S. Milienos

Department of Sociology, Panteion University of Social and Political Sciences, Greece

milienos@panteion.gr

key-words: Bounded cumulative hazard cure model, mixture cure model, EM-algorithm.

Abstract:
It is now common to assume that many patients after getting an appropriate treatment, will never face again the same problem, or to assume that a non-negligible proportion of people who have committed a crime, will never commit the same or other crime, during their lives. Having said that, modelling time-to-event should not ignore the existence of such individuals/items (known as cured), and this can be done by the theory of cure models; see, for example, the monographs by Maller and Zhou (1996, and Peng and Yu (2021). Hence, a great flexibility is offered by statistical models performing well under the existence or not of a cured proportion. In this talk we discuss some theoretical and practical aspects of such families, focusing to the parameter estimation. For illustrative purposes, analysis of two real life data sets (on recidivism and cutaneous melanoma) is also presented.

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Energy Decay Of Solutions For An Inverse Problem With Variable-Exponent

Metin Yaman[1], Zülal Mısır[1]

[1] Department of Mathematics,Faculty of Science and Arts, Sakarya University, Sakarya, TURKEY

myaman@sakarya.edu.tr, zulalmisir@sakarya.edu.tr

key-words: Decay of solution, inverse problem, variable exponent.

Abstract:
We study an inverse source problem with variable-exponent nonlinearities. Sufficient conditions on initial data for decay of solutions when the integral overdetermination tends to zero as time goes to infinity in acceptable range of variable exponents[1],[2].

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A New Interpoint Distance-based Clustering Algorithm Using Kernel Density Estimation

Soumita Modak

Faculty of Statistics, Department of Statistics, University of Calcutta, Basanti Devi College
147B, Rash Behari Ave, Kolkata- 700029, India

soumitamodak2013@gmail.com

key-words: Clustering algorithm, interpoint distance, nonparametric method, kernel density estimator, high-dimensional applicability.

Abstract:
A novel nonparametric clustering algorithm is proposed using the interpoint distances between the members of the data to reveal the inherent clustering structure existing in the given set of data [1], where we apply the classical nonparametric univariate kernel density estimation method [2] to the interpoint distances to estimate the density around a data member. Our clustering algorithm is simple in its formation and easy to apply resulting in well-defined clusters. The algorithm starts with objective selection of the initial cluster representative and always converges independently of this choice. The method finds the number of clusters itself and can be used irrespective of the nature of underlying data by using an appropriate interpoint distance measure [3]. The cluster analysis can be carried out in any dimensional space with viability to high-dimensional use. The distributions of the data or their interpoint distances are not required to be known due to the design of our procedure, except the assumption that the interpoint distances possess a density function. Data study shows its effectiveness and superiority over the widely used clustering algorithms.

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Control of a Degenerate and Singular Wave Equation in Cylindrical Domain

Alhabib Moumni[1] and Jawad Salhi[1]

[1]MAIS Laboratory, FST Errachidia, University of Moulay Ismail, Meknes, Morocco

alhabibmoumni2020@gmail.com, sj.salhi@gmail.com

key-words: Control, Wave equation, Hardy-Poincaré inequalities.

Abstract:
In this talk, we discuss the controllability problem for a one-dimensional degenerate and singular wave equation in cylindrical and non-cylindrical domains. Exact controllability is proved in the range of both subcritical and critical potentials and for sufficiently large time, through a boundary controller acting away from the degenerate/singular point. By duality argument, we reduce the problem to an observability estimate for the corresponding adjoint system, which is proved by means of the multiplier method and some Hardy-type inequalities.

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On the Existence and Uniqueness of Solution for the Riesz Fractional Derivative Equation

Assia Guezane-Lakoud[1], Somia Nasri[1] and Rabah Khaldi [1]

[1] Department of Mathematics, University of Badji Mokhtar-Annaba, Annaba, Algeria

a_guezane@yahoo.fr, soumiyanasri1992@gmail.com, rkhadi@yahoo.fr.

key-words: Fractional differential equation, riesz fractional derivative, existence.

Abstract:
This paper is based on [1],[2],[3] and devoted to study the existence and uniqueness of solution for Riesz fractional differential equation, using Krasnoselskii's fixed point theorem. We transform the problem considered to the singular integral equation and by using the compactness property of the Riemann Liouville fractional integral operator on Lebesgue space that we modify to prove the existence and uniqueness of solution for the problem considered.

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Approximation by Nonlinear Multivariate Sampling Kantorovich Operators and Quantitative Estimates

Nursel Çetin[1], Danilo Costarelli[2], Mariarosaria Natale[2,3] and Gianluca Vinti[2]

[1] Department of Mathematics, Ankara Haci Bayram Veli University, Turkey
[2] Department of Mathematics and Computer Science, University of Perugia, Italy
[3] Department of Mathematics and Computer Science Ulisse Dini, University of Firenze, Italy

danilo.costarelli@unipg.it, mariarosaria.natale@unifi.it, gianluca.vinti@unipg.it

key-words: Nonlinear operators, Orlicz spaces, order of approximation, quantitative estimates, kernel functions.

Abstract:
In the present talk, we will focus our attention on some quantitative estimates for the nonlinear multivariate sampling Kantorovich operators. A wide literature can be found in [6, 1, 7, 5, 2].
In [4], we establish such estimates in a nonuniform setting with respect to the modulus of smoothness in Orlicz spaces $L^{\varphi}(\mathrm{R}^n)$ defined in terms of the modular functional. As a consequence, the qualitative order of convergence can be obtained in the case of functions belonging to suitable Lipschitz classes. In the particular instance of L^p-spaces, $1 \leq p < +\infty$, using a direct approach, we obtain a sharper estimate than that one achieved in the general case.
Particular cases of the nonlinear multivariate sampling Kantorovich series based on Fejèr's kernel and B-spline kernels are also shown in detail.

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Best Proximity Points of Proximal Interpolative Contractions

Muhammad Nazam[1], Khalil Javedr[2]

[1] Department of Mathematics, Allama Iqbal Open University, Islamabad, Pakistan
[2] Department of Mathematics and Statistics, International Islamic University, Islamabad, Pakistan

muhammad.nazam@aiou.edu.pk

key-words: Best proximity point, proximal contraction, complete metric space.

Abstract:
The (fixed point) equation $\ell(r) = r$ is identical to $W(r) = 0$ where $W(r) = \ell(r) - r$. As a result, the concrete solution of such equations takes into account "fixed point theory." Any approximative solution is also worth examining and can be determined using the best proximity point theory in circumstances where such a problem cannot be solved. Best proximity roughly translates to the smallest value of $d(r, \ell(r))$ if $\ell(r)$ is not equal to r. Best proximity theorems, interestingly, are a natural development of fixed point theorems. When the mapping in question is a self-mapping, a best proximity point becomes a fixed point. The existence of a best proximity point can be determined by analyzing different types of proximal contractions, the details can be seen in [1]. The process of generalization of the existing notions has a vital role in any theory. Recently, two such generalizations have appeared in fixed point theory. First; the notion of interpolation contractions that was introduced by Erdal Karapinar in his paper [2] published in 2018, and the second notion was presented by Proinov in his paper [10] published in 2020.

Recently, Altun *et al.*[4], revisited all the interpolative contractions and defined interpolative proximal contractions. They presented best proximity theorems on such contractions. The aim of this talk is to introduce (L, E) interpolative proximal contractions and to establish best proximity point theorems for (L, E) interpolative proximal contractions, thereby extending Proinov contraction principle [10] to the case of non-self mappings. The (L, E)-proximal interpolative contractions generalize interpolative proximal contractions introduced in [4].

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Constrained Mock-Chebyshev Least Squares Quadrature

Francesco Dell'Accio[1], Filomena Di Tommaso[1], Federico Nudo[1,2]

[1] Department of Mathematics and Computer Science, University of Calabria, Rende, Italy
[2] Laboratoire de Mathématiques Appliquées de Pau (LMAP) - UMR 5142, E2S-UPPA, Université de Pau et des Pays de l'Adour (UPPA)

francesco.dellaccio@unical.it, filomena.ditommaso@unical.it, federico.nudo@unical.it

key-words: Equispaced nodes, Mock-Chebyshev least squares operator, Polynomial approximation, Quadrature formula.

Abstract:
The constrained mock-Chebyshev least squares interpolation is a univariate polynomial interpolation technique exploited to cut-down the Runge phenomenon. It takes advantage of the optimality of the interpolation on the mock-Chebyshev nodes, i.e. the subset of the uniform grid formed by nodes that mimic the behavior of Chebyshev–Lobatto nodes. The other nodes of the grid are not discarded, rather they are used in a simultaneous regression to improve the accuracy of the approximation of the mock-Chebyshev subset interpolant. In this work we use the constrained mock-Chebyshev least squares interpolation to obtain stable quadrature formulas with high degree of exactness and accuracy from equispaced nodes. Numerical tests demonstrate the effectiveness of the proposed method.

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The Null Boundary Controllability for the Mullins Equation with Periodic Boundary Conditions

Isil Oner

Department of Mathematics, Gebze Technical University, Türkiye

ioner@gtu.edu.tr

key-words: Null controllability, Mullins equation, moment method, periodic boundary condiition, one-dimensional fourth order parabolic equations.

Abstract:
In this paper, we study the null controllability of the Mullins equation with the control acting on the periodic boundary. Firstly, using the duality relation between controllability and observability, we express the controllability condition in terms of the solution of the backward adjoint system. After showing the existence and uniqueness of the solution of the adjoint system, we determine the admissible initial data class since the system is not always controllable under these boundary conditions. Finally, using this spectral analysis, we reduce the null controllability problem to the moment problem and solve the problem on this admissible initial class.

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Lifting of Conjugate Idempotents

Meltem Altun Özarslan

Department of Mathematics, Hacettepe University, Ankara, Türkiye

meltemaltun@hacettepe.edu.tr

key-words: Conjugate idempotent, lifting of idempotents, formal triangular matrix ring.

Abstract:
Two idempotents e and f of a ring R are called *conjugate* if $f = u^{-1}eu$ for some unit $u \in \mathrm{U}(R)$. Clearly, this relation is an equivalence relation on the set idem(R) of idempotent elements of R [3]. Recall that an ideal I in a ring R is called *idempotent lifting* if, whenever $a \in R$ is an idempotent modulo I, then there exists an idempotent $e \in R$ with $e - a \in I$ [5]. As a part of a recent study [4], Khurana et al. extended the usual lifting property of idempotents and introduced a new kind of lifting property for ideals, that is, an ideal I of a ring R is said to be *conjugate idempotent lifting* if x and y are elements in R such that their images in the factor ring R/I are conjugate idempotents, then there exist conjugate idempotents $e, f \in R$ such that $x - e, y - f \in I$. The purpose of this work [1] is to address this newly-appeared lifting property and investigate conjugate idempotent lifting ideals of formal triangular matrix rings as a continuation of our previous article [2].

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Newton Method with IDDM

Zeliha Özdemir[1], Gülnur Çelik Kızılkan[2] and Kemâl Aydın[1]

[1] Department of Mathematics, Selçuk University, Konya, Türkiye
[2] Department of Mathematics-Computer, Necmettin Erbakan University, Konya, Türkiye

ozzdemirrzzeliha@gmail.com, gckizilkan@erbakan.edu.tr, kaydin@selcuk.edu.tr

key-words: Newton method, IDDM , Newton method with IDDM.

Abstract:
Newton's method is one of the iterative methods used to find the roots of the equation $F(x) = 0$. It is generally preferred because it gives fast results and it is an iterative method [1, 2, 3]. Let's $\mathbf{x} \in \mathbb{R}^n$ and $\mathbf{F} : \mathbb{R}^n \to \mathbb{R}^n$. When Newton's method is used to solve the system of equations $\mathbf{F}(\mathbf{x}) = 0$, the inverse of the $\mathbf{J}(\mathbf{x})$ Jacobian matrix must be calculated. For this, there are studies in the literature that include different methods. One of these studies is the Broyden method, in which Sherman-Morrison formulas are used to calculate the matrix [6, 7]. Keskin (2005) and Keskin, Aydn (2007) gave the iterative dimension reduction method (IDDM) for the solution of the algebraic linear equation system given by $Ax = f$ [4, 5]. IDDM is an iterative method that divides the system into two blocks, reducing the size of the system at each step and calculating the solution of given equation system. In this study, a hybrid method similar to the Broyden method was obtained by using the iterative dimension reduction method (IDDM) for the solution of the linear equation system encountered in the Newton method. A procedure was written for the obtained method and numerical examples were given.

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Convergence of a Family of Sampling-Durrmeyer Operators in Weighted Spaces of Functions

Dilek Özer[1], Metin Turgay[1], and Tuncer Acar[1]

[1] Department of Mathematics, Faculty of Science, Selçuk University, 42003, Konya, Turkey

dilekozer@yahoo.com, metin.turgay@yahoo.com, tunceracar@ymail.com

key-words: sampling-Durrmeyer operators, weighted space, uniform convergence, rate of convergence.

Abstract:
The L^1 version of generalized sampling operators was first introduced by Bardaro et al. [4]. While Kantarovich modification is a method to approximate functions belonging to L^1, the method to approximate functions belonging to L^p spaces is to consider Durrmeyer modification of corresponding operators. Durrmeyer modification of the generalized sampling operators was first introduced by Bardaro et al. [5]. In this talk, we first give the basic concepts of sampling type approach methods. Next, we give well-definiteness of sampling Durrmeyer operators in weighted spaces of functions and we examine their pointwise and uniform convergence and determine rate of convergence via weighted modulus of continuity. A quantitative Voronovskaja theorem is also presented to obtain a rate of pointwise convergence and an upper estimate for this convergence.

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Jungck's Fixed Point Theorem for Weakly Compatible Mappings Satisfying Orthogonal F-contraction

Kübra Özkan

Department of Mathematics, Manisa Celal Bayar University, Manisa, Turkey

kubra.ozkan@hotmail.com and kubra.ozkan@cbu.edu.tr

key-words: Fixed point rheory, F-contraction, o-completeness.

Abstract:
In this paper, we proved two generalizations of Jungck's fixed point theorem for a pair of weakly compatible F-contraction mappings in orthogonal metric spaces. With the new results presented in the article, we generalize and enrich methods presented in the literature that we cite.

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A Result for Multivalued Mappings on Ultrametric Space

Aybala Sevde Özkapu[1], Eşref Erdoğan[1] and Özlem Acar[1]

[1] Department of Mathematics, Faculty of Science, Selçuk University, Konya, Türkiye

aybalasevdeozkapu.007@yahoo.com, esreferdogan@yahoo.com, ozlem.acar@selcuk.edu.tr

key-words: Fixed point, integral type mapping, ultrametric space.

Abstract:
Ultrametric spaces are a special type of metric space with strong triangle inequality. This strong triangle inequality shows some interesting properties that ultrametric spaces have, like any triangle being isosceles. For this reason, ultrametric spaces are also known as isosceles metric spaces. Many researchers have worked on various fixed point problems on ultrametric spaces. In 1998, Priess-Crampe and Ribenboim [7] proved the common fixed point theorem for ultrametric spaces and they give an applications to determine conditions for the existence of solutions of polynomial differential equations of any order, or even of systems of such equations with fixed point theorems. Considering the spherically completeness of a given ultrametric space, Gajic [5] obtained a fixed point theorem with uniqueness for the mappings having the property:

$$d(\mathcal{T}\varsigma,\mathcal{T}\eta) < \max\{d(\varsigma,\eta), d(\varsigma,\mathcal{T}\varsigma), d(\eta,\mathcal{T}\eta)\} \text{ for all } \varsigma,\eta \in X, \varsigma \neq \eta.$$

Then, many authors extend this result using different type contraction. (see [1, 2, 4, 6]) The aim of this talk to obtain a fixed point theorem using integral type multivalued maps on a spherically complete ultrametric space and give some corollaries and example.

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On Free Nilpotent Leibniz Algebras

Zeynep Özkurt

Department of Mathematics, Cukurova University, Adana, Turkey.

zyapti@cu.edu.tr

key-words: Leibniz algebras, automorphism, fixed points

Abstract:
Let F be a free nilpotent Leibniz algebra of finite rank over the field K of characteristic 0. In this study, a result about fixed points of a finite group of automorphisms of F is applied to fixed points for a single automorphism. And it is obtained the fixed point sets of some automorphisms of F.

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Convergence Theorems with a New Type Modulus of Continuity in the Locally Integrable Function Space

Fırat Özsaraç[1]

[1] Department of Mathematics, Kırıkkale University, Kırıkkale, Türkiye

firat_ozsarac@hotmail.com

key-words: Quantitative type theorems, weighted convergence, the convolution type singular integral operator, n-iterations.

Abstract:
In this presentation, we express a new modulus of continuity for locally integrable function spaces. Later, we acquire a quantitative type theorem for the rate of convergence of convolution type integral operators and iterates of them. Furthermore, we introduce their global smoothness preservation property with the inclusion of the mentioned modulus of continuity. In the final part, applications of the previously mentioned results will be given.

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A New Machine Learning-Based Cure Rate Model

Suvra Pal

Department of Mathematics, University of Texas at Arlington, Arlington, USA

suvra.pal@uta.edu

key-words: Cure rate model, support vector machine

Abstract:
In this talk, I will present a new cure rate model that uses the support vector machine to model the incidence part [1]. The proposed model inherits the features of the SVM and provides flexibility in capturing non-linearity in the data. Furthermore, the new model has the potential to incorporate high-dimensional covariates. For the estimation of model parameters, I will discuss the steps of an expectation maximization algorithm where I will make use of the sequential minimal optimization technique together with the Platt scaling method [2]. Next, I will present the results of a detailed simulation study and show that the proposed model outperforms the existing logistic regression-based cure rate model as well as the spline regression-based cure rate model, noting that the spline-based models can also capture complex patterns in the data [3]. This is specifically when the true boundary separating the cured and uncured subjects is non-linear. I will also show that the proposed model's ability to capture complex classification boundaries can improve the estimation results related to the latency part. Finally, I will analyze a data from leukemia cancer study and show that the proposed model results in improved predictive accuracy.

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Evaluation of Mean-Time-To-Failure Based on Nonlinear Degradation Data with Applications

Lochana Palayangoda[1], Hon Keung Tony Ng[2], Ronald W. Butler[3], Fangfang Yang[4], and Kwok Leung Tsui[5]

[1] Department of Mathematical and Statistical Sciences, University of Nebraska at Omaha, Nebraska, USA
[2] Department of Mathematical Sciences, Bentley University, Massachusetts, USA
[3] Department of Statistical Science, Southern Methodist University, Texas, USA
[4] School of Intelligent Systems Engineering at Sun Yat-sen University, Shenzhen, China
[5] Grado Department of Industrial and Systems Engineering at Virginia Polytechnic Institute and State University, Virginia, USA

lpalayangoda@unomaha.edu, tng@bentley.edu, rbutler@mail.smu.edu, fangfyang@foxmail.com, kltsui@vt.edu

key-words: Empirical saddlepoint approximation, first-passage time distribution, gamma process, Lévy process, trend-renewal-process, Wiener process.

Abstract:
Estimation of lifetime of highly reliable products is a challenging problem. Despite those products are hardly failed, their performance is subjected to degradation. Using stochastic processes, this degradation data can be used to obtain important lifetime information such as the first-passage (failure) time distribution and the mean-time-to-failure. Lévy process is a commonly used stochastic process to model the degradation and it can be applied when degradation measurements are linearly related to time throughout the lifetime of the product. However, the degradation data may not be linearly related to time in practice. In this study, trend-renewal-process-type models are considered for degradation modeling where a trend function is applied to transform the degradation data from which the Lévy process approach can be used. Several parametric and semiparametric models are proposed to estimate the first-passage time distribution and mean-time-to-failure for degradation data when degradation data are not linearly related to time. A Monte Carlo simulation study is used to demonstrate the performance of the proposed methods. Numerical examples of lithium-ion battery degradation data from two experiments are applied to illustrate the proposed methodologies.

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Approximation by Durrmeyer-sampling Type Operators: Quantitative Estimates in Functional Spaces

Danilo Costarelli[1], Michele Piconi[1,2] and Gianluca Vinti[1]

[1] Department of Mathematics and Computer Science, University of Perugia, Italy
[2] Department of Mathematics and Computer Science Ulisse Dini, University of Firenze, Italy

danilo.costarelli@unipg.it, michele.piconi@unifi.it, gianluca.vinti@unipg.it

key-words: Durrmeyer-sampling operators, Orlicz spaces, modulus of smoothness, order of approximation, quantitative estimates, kernel functions.

Abstract:
The Durrmeyer-sampling type operators [6] (DSO) have been introduced as a further generalization of the well-known Generalized [5] and Kantorovich-sampling operators [1].
In [2], a unifying theory on the convergence for DSO has been established in the general setting of Orlicz spaces, including some quantitative estimates on the order within the classical frame of uniformly continuous and bounded functions, by using the modulus of continuity.
In the present talk, we will also show some recent results on the order of approximation for DSO in the general setting of Orlicz spaces, based on quantitative estimates via the modulus of smoothness, defined by the modular functional [4]. We remark that working in this framework leads to a general theory that covers several functional spaces, such as L^p-spaces, Zygmund spaces and exponential spaces. In particular, we have deeply investigated the above problem in the remarkable case of L^p-spaces, by using a direct approach, providing a quantitative estimate that turns out to be sharper than the general one, thanks to the well-known properties of the usual L^p-modulus of smoothness.
Finally, also the qualitative versions of the above estimates will be discussed, considering functions belonging to suitable Lipschitz classes.

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Power-central Valued b-Generalized Derivation on Lie Ideals in Prime and Semiprime Ring

Francesco Rania

Department of Law, Economics and Sociology - Viale Europa, University Magna Graecia of Catanzaro, Catanzaro, Italy

raniaf@unicz.it

key-words: Prime ring, generalized derivation, right Martindale quotient ring.

Abstract:
Let R be a ring of characteristic different from 2 with extended centroid C, $n \geq 1$ a fixed positive integer, L a non-central Lie ideal of R, $F : R \to R$ a non-zero b-generalized derivation of R. We prove the following results:

1. If R is prime and $\Big(F(x)x\Big)^n \in C$ for all $x \in L$, then $R \subseteq M_2(K)$, the 2×2 matrix ring over a field K.
2. If R is semiprime and $\Big(F(x)x\Big)^n \in C$ for all $x \in R$, then R contains a non-zero central ideal. In particular, if R is prime, then it is commutative.

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Chordal Graphs, Higher Independence Complexes and Their Stanley-Reisner Ideal

Fred M. Abdelmalek[1], Priyavrat Deshpande [2], Shuchita Goyal[3], Amit Roy[4] and Anurag Singh[5]

[1] University of Toronto, Canada
[2] Chennai Mathematical Institute, India
[3] Indian Institute of Technology Delhi, India
[4] National Institute of Science Education and Research, Bhubaneswar, India
[5] Indian Institute of Technology Bhilai, India

amitiisermohali493@gmail.com
key-words: Chordal graph, monomial ideal, simplicial complex.

Abstract:
Given a finite simple undirected graph G there is a simplicial complex $\mathrm{Ind}(G)$, called the independence complex, whose faces correspond to the independent sets of G. This is a well studied concept because it provides a fertile ground for interactions between commutative algebra, graph theory and algebraic topology. In this article we consider a generalization of independence complex. Given $r \geq 1$, a subset of the vertex set is called r-independent if the connected components of the induced subgraph have cardinality at most r. The collection of all r-independent subsets of G form a simplicial complex called the r-independence complex and is denoted by $\mathrm{Ind}_r(G)$.

It is known that when G is a chordal graph the complex $\mathrm{Ind}_r(G)$ has the homotopy type of a wedge of spheres. Hence it is natural to ask which of these complexes are shellable or even vertex decomposable. We prove, using Woodroofe's chordal hypergraph notion, that these complexes are always shellable when the underlying chordal graph is a tree. Using the notion of vertex splittable ideals we show that for caterpillar graphs the associated r-independence complex is vertex decomposable for all values of r. Further, for any $r \geq 2$ we construct chordal graphs on $2r + 2$ vertices such that their r-independence complexes are not sequentially Cohen-Macaulay.

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A Projected Non-linear Conjugate Gradient Algorithm for Parameter Estimation in a Cure Rate Model

Suvra Pal[1] and Souvik Roy[1]

[1] Department of Mathematics, University of Texas at Arlington, Texas, USA

suvra.pal@uta.edu, souvik.roy@uta.edu

key-words: Cure-rate, optimization, cancer.

Abstract:
In this talk, we propose a new estimation methodology based on a projected non-linear conjugate gradient (PNCG) algorithm with an efficient line search technique. We develop a general PNCG algorithm for a survival model incorporating a proportion cure under a competing risks setup, where the initial number of competing risks are exposed to elimination after an initial treatment (known as destruction). Traditionally, expectation maximization (EM) algorithm has been widely used for such a model to estimate the model parameters. Using an extensive Monte Carlo simulation study, we compare the performance of our proposed PNCG with that of the EM algorithm, and show the advantages of our proposed method. We also demonstrate the robustness and efficiency of our proposed algorithm over other optimization algorithms (including other conjugate gradient type methods) readily available as R software packages. Finally, we apply our proposed algorithm to analyze a well-known melanoma data. This is a joint work with Suvra Pal.

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Unified Approach to Optimal Estimation of Mean and Standard Deviation from Sample Summaries

Jan Rychtar[1], Narayanaswamy Balakrishnan[2], Dewey Taylor[1] and Stephen D. Walter[2]

[1]Virginia Commonwealth University, Richmond, VA, USA
[2]McMaster University, Hamilton, Ontario L8S 4K1, Canada

rychtarj@vcu.edu, bala@mcmaster.ca, dttaylor2@vcu.eduwalter@mcmaster.ca
key-words: Interquartile range, five-number summary, range, sample mean, standard deviation.

Abstract:
Recently, various methods have been developed to estimate the sample mean and standard deviation when only the sample size, and other selected sample summaries are reported. In this paper, we provide a unified approach to optimal estimation that can be easily adopted when only some summary statistics are reported. We show that the proposed estimators have the lowest variance among linear unbiased estimators. We also show that in the most commonly reported cases, i.e., when only a three-number or five-number summary is reported, the newly proposed estimators match the previously developed estimators. Finally, we demonstrate the performance of the estimators numerically.

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Beyond Shapiro's Problem: from Cyclic Sums to "Graphic" Sums

Sergey Sadov

Moscow, Russia

serge.sadov@gmail.com

key-words: Cyclic inequalities, Shapiro's problem, graphic sums, asymptotics

Abstract:
The purpose of this communication is to review some nonstandard inequalities and asymptotics obtained by the author in recent years and to explain the line of thought that led to them.

Consider the power means $M_{k,p}(x_1,\dots,x_k)=[(x_1^p+\cdots+x_k^p)/k]^{1/p}$. The Shapiro-Diananda cyclic sums are the functions of n nonnegative variables

$$S_{n,k,p}(x_1,\dots,x_n)=\sum_{j=1}^{n} x_j/M_{k,p}(x_{j+1},\dots,x_{j+k}), \tag{23}$$

assuming addition of indices modulo n. Many math-inclined high-school students know the inequality $x_1/(x_2+x_3)+x_2/(x_3+x_1)+x_3/(x_1+x_2)\ge 3/2$. In 1954, H.S. Shapiro's proposed to prove that $C_{2,1}=1$ is the best constant in the inequality $n^{-1}S_{n,2,1}(\mathbf{x})\ge C_{2,1}\ \forall n$. This conjecture was soon refuted and the value $C_{2,1}\approx 0.989$ was determined by V.G. Drinfeld in 1971. Drinfeld's method allows one to treat sums $S_{n,2,p}$ similarly, but no rigorously justified algorithm is known for computing the best constants $C_{k,p}$ in the inequality $S_{n,k,p}(\mathbf{x})\ge C_{k,p}n$ — not even for $k=3$ and $p=1$.

In [1] the bounds $k(2^{1/k}-1)\le C_{k,1}\le\gamma_k$ are proved, where γ_k is the root of a certain transcendental equation; γ_2 is Drinfeld's constant. There exists $\lim_{k\to\infty}C_{k,1}$, it is contained in $[\ln 2,\gamma_\infty\approx 0.93]$.

Since the constants $C_{k,1}$ are bounded away from 0 and ∞, one is tempted to let k in the right-hand side of (23) vary with j and to minimize over all possible choices of k_j's: introduce

$$S_{n,*,p}(x_1,\dots,x_n)=\min_{k_1,\dots,k_n\in\mathbb{N}}\sum_{j=1}^{n} x_j/M_{k_j,p}(x_{j+1},\dots,x_{j+k_j}).$$

But now the best lower bound for $S_{n,*,1}$ is no longer linear in n. The precise asymptotics is found in [5]: $\inf_{\mathbf{x}} S_{n,*,1}(\mathbf{x})=e\ln n-C+O(1/\ln n)$, where $C\approx 0.705$.

The problem to determine the g.l.b. of $S_{n,k,p}(\mathbf{x})$ is easy in the limit cases $p=\pm\infty$. In [4] we propose a way to restore a level of nontriviality of the problem: consider "graphic" sums as a generalization of cyclic sums. Let Γ be a directed graph, V be the set of its vertices, and $\Gamma^+(v)$ denote the out-neighborhood of a vertex $v\in V$. Let $\mathbf{x}$ be a vector with components labeled by $v\in V$. We define the "min-sums"

$$S_\wedge(\mathbf{x}|\Gamma)=\sum_{v\in V}^{n} x_v/\min_{v'\in\Gamma^+(v)} x_{v'}.$$

For all strongly connected digraphs on n vertices the inequality $S_\wedge(\mathbf{x}|\Gamma)\ge C_\wedge(n)$ holds. The best constant has the asymptotics $C_\wedge(n)=e\ln n+O(1/\ln n)$. Our proof depends on the study of a class of optimization problems generalizing the inequality between the arithmetic and geometric means [2]. Also in that class we find a previously studied asymptotical problem involving certain "quasi-cyclic" rational sums [3].

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On the equivalence of being Homogeneous and Homogeneous Type for 4-generated Pseudo symmetric semigroups

Nil Şahin

Industrial Engineering Department, Bilkent University, Ankara, Turkey

key-words: pseudo symmetric semi groups, homogeneous semigroups, homogeneous type semigroups.

Abstract:
Let S be a 4-generated pseudo symmetric semigroup generated by the positive integers $\{n_1, n_2, n_3, n_4\}$ where $\gcd(n_1, n_2, n_3, n_4) = 1$. k being a field, let $k[S]$ be the corresponding semigroup ring and I_S be the defining ideal of S. Tangent cone of S is $k[S]/I_{S_*}$ where $I_S =< f_* | f \in I_S >$. We compute the betti sequence of the tangent cone of S. Looking for the answer of the question "Are there pseudo symmetric semigroups with Cohen-Macaulay tangent cones that are not homogeneous but of homogeneous type?", for 4 generated Pseudo-symmetric numerical semigroups having Cohen-Macaulay tangent cone, we show that being homogeneous and of homogeneous type are the same.

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Modified Unit Exponent Distribution

Rahime Nur Şahin[1] and Buğra Saraçoğlu[1]

[1] Department of Statistics, Selçuk University, Konya, Türkiye

rahime0624@gmail.com, bugrasarac@selcuk.edu.tr

key-words: Unit Distribution, exponential distribution, Mmdified unit exponential, parameter estimates.

Abstract:
In this study, a new unit distribution, the Modified Unit Exponential distribution, is proposed. Some distributional features of the new distribution such as life function, hazard function, quantile function were obtained. Maximum likelihood, Least Squares, Weighted Least Squares, Anderson-Darling and Cramer-von Mises methods were used for parameter estimation. In the simulation study, the mean squares error of the parameter estimates were calculated. In addition, the new Modified Unit Exponential distribution obtained by applying real data is compared to other distributions.

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Results for Some Classes of Interpolative Contractions in Convex b-Metric Space

İsa Yıldırım[1], Y. Serdar Şahin[2]

[1] Department of Mathematics, Faculty of Science, Atatürk University, Erzurum, 25240, Turkiye

isayildirim@atauni.edu.tr, yunussahin96@hotmail.com

key-words:

Abstract:
When the interpolative type contractions in the literature are examined, it is seen that the fixed points of such mappings are obtained by Picard iteration (see [2],[3],[6],[7],[5]). Our aim in this paper is to show that the fixed points of these contractions classes can be found by means of different iterations. It is already known that convex structure is needed for different iteration schemes. So, in this work, we firstly give the definition of the convex b-metric space and we introduce Mannis iteration scheme in such space. We also prove some fixed point theorems for two types of interpolative contraction mapping using Mannis iteration scheme in convex b-metric spaces. For this, the fixed points of these contractions classes are obtained via Mann iteration [9],[10] by taking convex metric space instead of metric space. Now we will give some definitions that we will use in our results, respectively.

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On Fatou Sets Containing Baker Omitted Value

Satyajit Sahoo

School of Mathematical Sciences, National Institute of Science Education and Research, Bhubaneswar, India

ssahoomath@gmail.com

key-words: Keywords1, keywords2, keywords3.

Abstract:
An omitted value of a transcendental meromorphic function f is called a Baker omitted value, in short *bov* if there is a disk D centered at the bov such that each component of the boundary of $f^{-1}(D)$ is bounded. Assuming that the bov is in the Fatou set of f, this article investigates the dynamics of the function. Firstly, the connectivity of all the Fatou components are determined. If U is the Fatou component containing the bov then it is proved that a Fatou component U' is infinitely connected if and only if it lands on U, i.e. $f^k(U') \subset U$ for some $k \geq 1$. Every other Fatou component is either simply connected or lands on a Herman ring. It is proved that the Fatou component containing the bov is completely invariant whenever it is forward invariant. Further, if the invariant Fatou component is an attracting domain and compactly contains all the critical values of the function then the Julia set is totally disconnected. Baker domains are shown to be non-existent whenever the bov is in the Fatou set. It is also proved that, if there is a 2-periodic Baker domain (these are not ruled out when the bov is in the Julia set), or a 2-periodic attracting or parabolic domain containing the bov then the function has no Herman ring.

References

A Fixed Point Approach to Study a Differential Inclusion with Subdifferentials

Soumia Saïdi

Department of Mathematics, Mohammed Seddik Benyahia University, Jijel, Algeria

soumiasaidi44@gmail.com

key-words: Differential inclusion, subdifferential, fixed point.

Abstract:
Differential inclusions of subdifferential type have been considered in the scientific literature by many authors. Most of them includes as particular cases sweeping processes. They are found in evolution variational inequalities and in optimal control theory, with further related research and applications. We are motivated, in the current work, by the recent papers [1], [2], dealing with second-order differential inclusions governed by the subdifferential operators. We aim to provide a new contribution on this topic. We will proceed in our development by a fixed point approach to state the existence result. Then, we will use it to deduce an appropriate application.

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A Fixed Point Theorem in Extended Fuzzy Metric Spaces

Meryem Şenocak[1], Erdal Güner[1]

[1] Department of Mathematics, Faculty of Sciences, Ankara University, 06100 Ankara, Türkiye

meryemsnck@gmail.com, guner@science.ankara.edu.tr

key-words: Fixed-point, extended fuzzy metric space, fuzzy contraction.

Abstract:
In this article we would like to present the proof of a theorem ([7], Theo.4), which includes a special mapping. In this paper the theorem will be proved. The authors described the extended fuzzy metrics, took this new fuzzy space in great detail and looked at it differently in the study. Especially the contraction mapping in this space, the point "t=0" comes to the fore. While making the proof, we also emphasized the "t=0" point and drew attention to it.

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Interval Estimation for the Poisson Regression with Lognormal Unobserved Heterogeneity

Sümeyra Sert

Department of Statistics, Selçuk University, Konya, Turkey

sumeyra.sert@selcuk.edu.tr

key-words: Poisson regression, asymptotic maximum likelihood estimation, likelihood ratio, bootstrap, confidence intervals.

Abstract:
In this study, we discussed statistical inference on Poisson regression with log-normal unobserved heterogeneity. The likelihood ratio and bootstrap confidence intervals are discussed and a simulation study is performed to compare these intervals. A numerical example is also provided to illustrate the discussed procedures.

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Degenerate Conformable Fractional α-Order Differential Operator

Meltem Sertbaş

Karadeniz Technical University, Trabzon, Turkey

m.erolsertbas@gmail.com

key-words: Degenerate conformable differential operator, minimal and maximal operators, normal operator, extension, spectrum.

Abstract:
In this work, it is established all normal extensions domains structure on the weighed Hilbert space $L^2_\alpha(H,(0,1))$ for a formally normal minimal operators class defined by a degenerate conformable α-order differential-operator

$$(Bu)^{(\alpha)}(t) + Au(t), \quad \alpha, t \in (0,1),$$

where a positive selfadjoint $B : H \to H$ has a closed range, $KerB$ is nontrivial subspace and $A : H \to H$ is a selfadjoint operator. In addition, it is given the analysis of the spectrum set for any normal extensions.

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The Effect of Reinsurance Contracts on Ruin Probability

Demet Sezer

Department of Actuarial Sciences, Selcuk University, Konya, Turkey

dsezer@selcuk.edu.tr

key-words: Claim size, reinsurance, ruin.

Abstract:
Reinsurance is the transfer of some of the risks of a ceding insurance company to another insurance company. There are various types of reinsurance, both proportional and non-proportional, between ceding and reinsurance companies. Determining which of these reinsurance types will be more effective in reducing the probability of a company's ruin is a rather complex problem. In particular, according to different types of distributions such as symmetrical, skewed left, skewed right in terms of claim size distribution, determining which reinsurance agreement will be more beneficial for the company in terms of the probability of ruin is a more complex problem. Solving such complex problems with simulation is much more practical than solving them theoretically. In this study, considering different types of claims and reinsurance agreements, the probability of ruin of companies has been tried to be obtained by simulation and it has been tried to determine which reinsurance agreement is more suitable for which type of claim size.

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On Univalent Function Theory

Navneet Lal Sharma

National Rail and Transportation Institute (NRTI), Vadodara

sharma.navneet23@gmail.com

key-words:

Abstract:
Let $\mathbb{A}$ denote the family of all functions f that are analytic in the unit disk $\mathbb{D} := \{z \in \mathbb{C} : |z| < 1\}$ and normalized so that $f(0) = 0$, $f'(0) = 1$. Clearly, a function $f \in \mathbb{A}$ has the Taylor series expansion of the form $f(z) = z + \sum_{n=2}^{\infty} a_n z^n$. Denote by $\mathcal{S}$ the family consisting of functions $f \in \mathbb{A}$ that are univalent in $\mathbb{D}$. In this talk, I will discuss the properties of the class $\mathcal{S}$ like: coefficient bounds, Growth & Distortion theorems. Also, I will discuss geometric subclasses of $\mathcal{S}$ like: starlike, convex and close-to-convex with their properties.

This talk is based on the books [1, 2, 4].

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Study of Some Approximation Estimates Concerning Convergence of (p, q)-variant of Linear Positive Operators

Prerna Sharma

Department of Basic Science, Sardar Vallabh Bhai Patel University of Agriculture and Technology University, Meerut (U.P.), India

prernam2002@gmail.com

key-words: (p, q)-calculus, (p, q)-Szász Beta operators, (p, q)-Beta function of second kind, Direct estimates.

Abstract:
After studying a number of investigations in the approximation theory on (p, q)-calculus, this paper is a study on (p, q)-Szász-Mirakyan-Beta operators and their approximation properties in weighted space. We construct the operators and derive some lemmas as the auxiliary results. We establish a Voronovskya type asymptotic formula and also present some direct results using modulus of continuity.

For $x \in [0, \infty)$ and for $0 < q < p \leq 1$, we present (p, q) Szász-Mirakyan-Beta operators using (p, q)-Beta function of second kind as

$$T_{n,p,q}(f; x) = \sum_{m=1}^{\infty} s_{n,p,q}^{m} \frac{1}{B_{p,q}(m, n+1)} \int_{0}^{\infty} \frac{t^{m-1}}{(1 \oplus pt)_{p,q}^{m+n+1}} f(p^2 q^m t) d_{p,q}t + \frac{f(0)}{e_{p,q}([n]_{p,q}x)}. \tag{24}$$

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Semiparametric Inference in One-shot device with Competing Risks

H.Y. So[1], M.H. Ling[2], C. Yu[3] and N. Balakrishnan[3]

[1] Department of Mathematics and Statistics, Oakland University, Rochester Hills, MI, USA
[2] Department of Mathematics and Information Technology, The Education University of Hong Kong, Hong Kong SAR, China
[3] Department of Mathematics and Statistics, McMaster University, Hamilton, ON, Canada

hso@oakland.edu, mit@eduhk.hk, bala@mcmaster.ca

key-words: Semi-parametric, competing risks, one-shot devices, acceletated life testing

Abstract:
One-shot devices are products that will be destroyed immediately after use. Hence, only such products' binary status, success or failure, can be observed instead of its lifetime. To avoid misspecification in lifetime distributions of the components, we proposed a proportional hazards model for analyzing the relationship between the lifetime of the components and the stress level. This study tests the one-shot devices under constant stress accelerated life-test. A link function relating to stress levels and lifetime is then applied to extrapolate the lifetimes of units from accelerated conditions to normal operating conditions. Most of the one-shot devices consist of more than one component. Malfunctioning any one of the components will result in the device's failure. The failed devices are inspected to identify the specific cause of failure. We will analyze the competing risks model with the proportional hazard and other semi-parametric assumptions.

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Asymptotic Properties of Spacings

Alexei Stepanov

Institute of Physics, Mathematics and Information Technology, Immanuel Kant Baltic Federal University, Kaliningrad, Russia

alexeistep45@mail.ru

key-words: Order statistics, spacings, limit results.

Abstract:
Spacings play an important role in many research areas such as goodness-of-fit tests, reliability analysis, survival analysis and inferential methods. A lot of practical problems and applications are associated with spacings; see, for example, [1] and [2]. In the present work, we discuss some asymptotic properties of spacings.

Let $X_1, X_2, \ldots, X_n$ be independent and identically distributed random variables with continuous unbounded cumulative distribution F. Let $X_{1,n} \leq X_{2,n} \leq \ldots \leq X_{n,n}$ be the corresponding order statistics and $S_{i,n} = X_{i+1,n} - X_{i,n}$ $(i = 1, \ldots, n-1)$ be the spacings based on these order statistics.

For analyzing the asymptotic behavior of lower and upper spacings, let us make use of "thickness“ of right and left distribution tails. For $s > 0$, let us consider the limits

$$\lim_{x\to\infty} \frac{1 - F(s+x)}{1 - F(x)} = \beta(s), \tag{25}$$

$$\lim_{x\to-\infty} \frac{F(x-s)}{F(x)} = \gamma(s). \tag{26}$$

The limits in (25) and (26) were previously used for analyzing the numbers of observations registered near order statistics; see, for example, [2]. We use here the limits in (25) and (26) for producing asymptotic results for lower and upper spacings. In particular, the following statement holds true.

Proposition 0.1 *(1) Let the limit in (25) exist for all $s > 0$. Then*

$$P(S_{n-k,n} > s) \to \beta^k(s) \quad (k \geq 1,\ n \to \infty).$$

(2) Let the limit in (26) exist for all $s > 0$. Then

$$P(S_{k,n} > s) \to \gamma^k(s) \quad (k \geq 1,\ n \to \infty).$$

Other asymptotic properties of spacings will be presented in my talk.

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International E-Conference on Mathematical and Statistical Science: A Selcuk Meeting

Limiting Sequential Decompositions and Applications in Finance

Gero Junike[1], Hauke Stier[1] and Marcus C. Christiansen[1]

[1] Institut für Mathematik, Carl von Ossietzky Universität Oldenburg, Oldenburg, Germany

gero.junike@uni-oldenburg.de, hauke.stier@uni-oldenburg.de, marcus.christiansen@uni-oldenburg.de

key-words: sequential decomposition, change analysis, profit and loss attribution.

Abstract:
If we consider for example the profits and losses of a portfolio of foreign shares or bonds, it is often not easy to determine the impact of the different risk factors, such as interest rates, credit spreads or foreign exchange rates. Therefore the decomposition of a nonlinear output is a common challenge. For example it is not trivial to decompose the profits and losses of a foreign stock into stock price movements and the change in the exchange rate. There are several decomposition methods in literature. A desirable property of a decomposition is additivity. Let $f(X)$ descripe the output, e.g. profits and losses, depending on the risk factors $X = (X_1, \ldots, X_d)$. Then additivity means that the contributions D_i of the risk factors X_i to $f(X)$ add up to the output $f(X)$, i.e. $f(X) = D_1 + ... + D_d$. Additivity makes the decomposition easy to interpret. The current practice is to use sequential updating (SU) methods, see [4] and [3], where one risk factor is updated after the other. SU decompositions are additive, but the main disadvantage of those methods is that the decomposition is not symmetric, which means that it depends on the order of the risk factors. A possible solution of this problem is to build the average of the decompositions for all possible update orders, see [2].

[1] propose to increase the number of updating steps to infinity. Under some conditions they obtain a symmetric decomposition. In this paper we investigate the ISU (infinitesimal sequential updating) decomposition by [1] in the case that the output is described by a twice differentiable function f and offer a proof of convergence of the SU decomposition. We will see that in this case the ISU decomposition is not symmetric, which is why we also investigate the average ISU decomposition. In practice we have to calculate $d!$ ISU decompositions to obtain the average decomposition. We show that it is sufficient to compute only $\frac{d(d+1)}{2}$ ISU decompositions if X has continuous paths.

In a third part we illustrate the average ISU decomposition by some applications, where the output can be described by a twice differentiable function. Furthermore we examine numerically the question, how large the number of updating steps must be to obtain an appropriate approximation of the ISU decomposition.

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Properties of Hurwitz Stable Matrix Families

Güner Topcu

Department of Mathematics, Faculty of Science, Selçuk University, Konya, Turkey

guner.ozturk@selcuk.edu.tr

key-words: Hurwitz stability, continuity theorems, linear combination, convex combination.

Abstract:
In this study, it is investigated some properties of matrix families $\mathcal{L}(A_1, A_2)$ and $\mathcal{C}(A_1, A_2)$ which consist of linear and convex combinations of matrices $A \in H_N = \{A \in M_N(\mathbb{C}) \mid Re(\lambda_i(A)) < 0\}$ and $B \in M_N(\mathbb{C})$, respectively. In the literature, a necessary and sufficient condition for matrix A to be Hurwitz stable is that the Lyapunov matrix equation $A^*F + FA + I = 0$ must have a matrix $F = F^* > 0$, according to Lyapunov's theorem. Moreover, the parameter κ which indicates the quality of Hurwitz stability of the matrices, is defined as $\kappa(A) = 2\|A\|\|F\| \leq 1$. If the condition $\kappa(A) < \infty$ is provided then A is Hurwitz stable matrix, on the other hand it is not Hurwitz stable then shown with "$\kappa(A) = \infty$" [3, 4]. $\kappa^*(> 1)$ parameter specified by users, if $\kappa(A) \leq \kappa^*$ then the matrix A is κ^*-Hurwitz stable matrix [1, 2, 5]. The sensitivity of Hurwitz stable matrices are determined by the continuity theorems. In this study, the matrix families $\mathcal{L}(A_1, A_2)$ and $\mathcal{C}(A_1, A_2)$ were given [7]. Using the continuity theorems in [6], a necessary condition (i.e. the intervals) for Hurwitz stability (κ^*-Hurwitz stability) of matrix families was given. These intervals guarantees the Hurwitz stability (κ^*-Hurwitz stability) of the matrix families. After all some properties about these families were introduced.

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Sampling Kantorovich Algorithm for the Detection of Alzheimer's Disease

Danilo Costarelli [1], Marco Seracini[2], Arianna Travaglini[1,3], Gianluca Vinti[1]

[1] Department of Mathematics and Computer Science, University of Perugia (Italy)
[2] Department of Physics and Astronomy "Augusto Righi", University of Bologna (Italy)
[3] Department of Mathematics and Computer Science "U. Dini", University of Florence (Italy)

danilo.costarelli@unipg.it, marco.seracini2@unibo.it, arianna.travaglini@unifi.it, gianluca.vinti@unipg.it

key-words: Sampling Kantorovich algorithm, alzheimer biomarkers, image processing.

Abstract:
Among sampling-type operators, the Sampling Kantorovich operator represents a useful tool for dealing with discontinuous functions [2]. Its muldimensional version has been implemented and allows not only to reconstruct, but also to enhance the resolution of images, as it acts boths as a low-pass filter and as a magnifier, increasing spatial resolution of images [4]. Indeed, Sampling Kantorovich algorithm has been used, with satisfactory results, to both biomedical and engineering fields [1, 3].
The talk is focused on some recent results, which consist in the use of different algorithms, including Sampling Kantorovich algorithm, to process magnetic resonance images for the identification of biomarkers for Alzheimer's disease. The quality of reconstruction is evalueted, comparing the volumetric values of the images processed with the various algorithms, with the ground truth values, considered as reference. Moreover, the stereological Cavalieri\Point counting technique is used to infer volumetric data, starting from the knowledge of the planar sections.

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Approximation by Bivariate Generalized Sampling Series in Weighted Spaces of Functions

Metin Turgay

Department of Mathematics, Selçuk University, Konya, Türkiye

metin.turgay@yahoo.com

key-words: Bivariate generalized sampling series, weighted approximation, weighted modulus of continuity.

Abstract:
This talk aims to study the convergence properties of the bivariate generalized sampling series in weighted spaces of functions. We present pointwise convergence of the series at continuity points of target functions and uniform convergence for weighted uniformly continuous functions. By using bivariate weighted modulus of continuity a rate of convergence for the series is also presented and for differentiable functions a Voronovskaja theorem is obtained as well.

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Robustness of Randomization Tests for Repeated Measures Desig

Ajali John Obasi[1], Abimibola Victoria Oladugba[1] and Ifeoma Ogochukwu Ude[1]

Department of Statistics, University of Nigeria, Nsukka, Nigeria

abimibola.oladugba@unn.edu.ng, ude.ifeoma@unn.edu.ng

key-words: Randomization test, outlier, Type I error, robustness, power and Monte Carlo.

Abstract:
Randomization tests (R-test) are often advocated as an alternative data analysis method when assumptions of most commonly used statistical techniques (such as analysis of variance, regression analysis, t-test, and analysis of covariance etc.) are violated. In this work, the robustness in terms of empirical type I error and power (sensitivity) of R-test was evaluated and compared with that of F-test in the analysis of a single factor repeated measures design; when the data are normal, and non-normal with or without outliers under varied sample sizes and number of treatments. The Monte Carlo approach was used in the simulation study. The results showed that when the data are normal, the R-test was approximately as sensitive and robust as the F-test, while it was more sensitive than the F-test when data had skewed distributions. The R-test was more sensitive and robust than the F-test in the presence of an outlier.

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Computing Syzygy Modules and H-bases Using Linear Algebraic Methods

Uğur Ustaoğlu[1], Sibel Cansu[1] and Erol Yılmaz[1]

[1]Department of Mathematics, Bolu Abant İzzet Baysal University, Bolu, Türkiye

ugur.ustaoglu@ibu.edu.tr, kilicarslan_s@ibu.edu.tr, yilmaz_e2@ibu.edu.tr
key-words: H-bases, Gröbner bases, syzygies.

Abstract:
The concept of Gröbner bases, which Buchberger introduced in his Ph.D. dissertation in 1965 [3], plays an important role in the development of computational algebraic geometry and computer algebra systems. A serious drawback of Gröbner bases, however, is the fact that they are based on monomial orderings. In 1914, Macaulay in [1] introduced the concept of H-bases which is independent of monomial orderings and is merely tied to the maximal degree (homogeneous part) of a polynomial, the so-called leading form. Since H-bases rely only on the total degree and homogeneous components, symbolic algorithms to construct H-bases without using any monomial ordering were introduced in [2],[5] and [4]. These algorithms are direct generalizations of Buchbergers algorithm and rely on a reduction algorithm which is a generalization of Euclidean division with remainder to the multivariate case. These generalized reductions lead to a characterization of H-bases which is based on reducing a generating set of the syzygy module of leading forms. Therefore, determining a basis for the module of syzygies of finitely many homogeneous forms becomes a crucial part of the construction of the H-bases.

The main objective of this study is to present an improved algorithm to compute bases for the module of syzygies and H-bases by relying on techniques from linear algebra. The key component of our approach is to generate an augmented homogeneous matrix of coefficient vectors of leading forms of polynomials so that the remainder of the generalized division algorithm as well as syzygies of a certain degree can be read from the row reduced echelon form of this matrix. In this way, unlike the known methods, instead of applying similar linear algebraic methods over and over again, many results are obtained with a single row reduction operation. Another innovation we have brought to existing methods is the formula we propose to determine the upper limit at which the algorithm will terminate. In this way, our algorithm will reach the result with less processing.

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Approximation Properties of Some Non-positive Kantorovich Type Operators

Bianca Ioana Vasian

Department of Mathematics and Computer Science, Transilvania University of Brasov, Brasov, Romania

bianca.vasian@unitbv.ro

key-words: Kantorovich operators, Szasz-Mirakjan opeartors, Bernstein operators, Non-poistive operators.

Abstract:
In this paper we will construct a generalization of Bernstein operators using Kantorovich's method. In this sense we will use a general derivative operator denoted by D^* and its corresponding anti-derivative operator I^*, having the property $D^* \circ I^* = I^* \circ D^* = Id$. We will prove that the convergence on all integrable functions on $[0,1]$ holds even though the operators constructed this way are not positive. A Kantorovich modification of Szasz-Mirakyan operators will be studied as well, using another approach for the proof of convergence on $C[0,\infty)$.

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Criterium of nontriviality of solutions of a convolution type equation

Volodymyr Dilnyi [1], Andriana Vinskovska[2]

[1] Department of Higher Mathematics, Lviv Polytechnic National University/Lviv, Ukraine
[2] Department of Mathematics and Economics, Drohobych State Pedagogical University/Drohobych, Ukraine

andriankav1112@gmail.com

key-words: signal processing, detection, convolution

Abstract:
Convolution operations are very important in mathematical community.

P. Lax, B. Nyman, V. Gurarii and others [1] considered the equation

$$\int_{-\infty}^{0} f(u+\tau)g(u)du = 0, \tau \le 0, g \in L^2(-\infty;0) \tag{27}$$

where unknown function f belongs to $L^2(-\infty;0)$. This equation is the detection model with test signals g for an unknown signal (filter) f.

Let $H^p(\mathbf{C}_+)$, $1 \le p < +\infty$, be the Hardy space of analitic in the half-plane $\mathbf{C}_+ = \{z : \mathrm{Re} z > 0\}$ functions f, for which $||f||^p = \sup\limits_{x>0} \left\{ \int\limits_{-\infty}^{+\infty} |f(x+iy)|^p dy \right\} < +\infty$.

Each function $\psi \in H^p(\mathbf{C}_+)$, $1 \le p < +\infty$, has nontangential boundary values almost everywhere on the imaginary axis $i\mathbf{R} = \partial \mathbf{C}_+$. These values we also define by ψ and $\psi \in L^p(i\mathbf{R})$

Let us define the function $\Phi(iy) = F(iy)G(iy)$ almost everywhere on $i\mathbf{C}$, where $F(iy)$ and $G(iy)$ are nontangential boundary values of the functions F and G. The following solvability criterion is the fundamental fact for the analysis of equation (27).

Theorem 1. $f \in L^2(-\infty;0)$ is a solution of equation (27) if and only if there exists a function $P \in H^1(\mathbf{C}_+)$ such that nontangential boundary values of P equal to Φ almost everywhere on $i\mathbf{R}$.

Let $E^p[D_\sigma]$ and $E^p[D_\sigma^*], 1 \le p < +\infty, \sigma > 0$, be the spaces of analitic functions respectively in the domains $D_\sigma = \{z : |\mathrm{Im} z| < \sigma, \mathrm{Re} z < 0\}$ and $D_\sigma^* = \mathbf{C} \backslash \overline{D}_\sigma$, for which $\|f\| := \sup \left\{ \int\limits_{\mu} |f(z)|^p |dz| \right\}^{1/p} < +\infty$, where supremum is taken over all segments μ, that are contained in D_σ and D_σ^* respectively.

The following generalization of equation (27)

$$\int_{\partial D_\sigma} f(w+\tau)g(w)dw = 0, \tau \le 0, g \in E^2[D_\sigma^*] \tag{28}$$

is considered, where an unknown function f belongs to $E^2[D_\sigma]$.

Let $\Phi_j(it) = F_j(it)G(it), j \in \overline{1;3}, t \in \mathbf{R}$. Our main result is the following theorem, where F_j and G are the characteristic functions.

Theorem 2. A function $f \in E^2[D_\sigma]$ is a solution of equation (28) if and only if there exists a function P_1, $P_1 e^{-i\sigma z} \in H^1_\sigma(\mathbf{C}_+)$, such that nontangential boundary values of P_1 are equal to $\Phi_1(it), t \in \mathbf{R}$, almost everywhere on the imaginary axis.

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On Antisymmetry of Boundary Values

Volodymyr Dilnyi[1], Khrystyna Voitovych[2], Oksana Zhuk[2]

[1] Department of Higher Mathematics, Lviv Polytechnic National University, Lviv, Ukraine
[2] Department of Mathematics and Economics, Drohobych State Pedagogical University, Drohobych, Ukraine

dilnyi@ukr.net, khrystyna.huk2711@gmail.com, oksanalakomchak@gmail.com

key-words: Analytic functions, boundary values, Hardy space.

Abstract:

Let P_σ be a class of holomorphic functions f in the domain $\mathbf{C}_+ \setminus (-\infty; 0)$ with cut along the negative real axis, for which

$$\sup_{|\varphi|<\pi} \left\{ \int_0^{+\infty} \left| f_1(re^{i\varphi}) \right|^p e^{-\sigma\sqrt{r}p\left|\sin\frac{\varphi}{2}\right|} dr \right\}^{1/p} < +\infty.$$

Space $H^p_\sigma(\mathbf{C}_+), \sigma \geq 0, 1 \leq p < +\infty$, is the space of analytic functions in the half-plane $\mathbf{C}_+ = \{z : \mathrm{Re} z > 0\}$ for which

$$||f|| := \sup_{-\frac{\pi}{2}<\varphi<\frac{\pi}{2}} \left\{ \int_0^{+\infty} |f(re^{i\varphi})|^p e^{-pr\sigma|\sin\varphi|} dr \right\}^{1/p} < +\infty.$$

Theorem 1. *Function f belongs to $H^1_\sigma(\mathbf{C}_+)$ if and only if function*

$$f_1(z) = \frac{f(\sqrt{z})}{\sqrt[p]{z}}$$

belongs to P_σ.

Functions $f \in H^p_\sigma(\mathbf{C}_+)$ have almost everywhere on $i\mathbf{R}$ the boundary nontangential values, which we denote by $f(it)$ and $f(it)e^{-\sigma|t|} \in L^p(\mathbf{R})$.

Theorem 2. *Let $f \in H^p_\sigma(\mathbf{C}_+)$ and $f(it) = -f(-it)$ almost everywhere on $\mathbf{R}$. Then the operator $K : z \to \frac{f(z)}{\sqrt[p]{z}}$ maps f to the entire function.*

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Closed Queueing Network Analysis of Vehicle Sharing in a City

Bharat Raj Wagle[1], Ram Prasad Ghimire[2]

[1] School of Business, Pokhara University, Pokhara, Nepal
[2] Department of Mathematics, School of Sciences, Dhulikhel, Nepal

bharatrajwagle@gmail.com
key-words: Closed queueing, queueing network, vehicle sharing.

Abstract:
Vehicle sharing is an immense issue in the world from the point of view of environmental protection, traffic management, and economics. Our study deals with the construction of a closed queueing network with a finite number of nodes and vehicles that provide the service to the riders. The customers' average arrival and service rate are provisioned to be heterogeneous on a first-come-first-served basis. Arrivals of the customers in the nodes are taken to be Poisson and the customer's service in exponential fashion. With the help of the transition diagram under study, finite equations have been set up, which have been solved explicitly to obtain the probability of individual state conditions of vehicles. Moreover, the performance of the network's product form is obtained by using the Gorden and Newell theorem of closed queueing networks. Some numerical results with the help of MATLAB software have also been computed to show the validity and the applicability of the model under study.

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Quaternions Associated to Curves and Surfaces

Haohao Wang[1], J. William Hoffman[2]

[1] Department of Mathematics, Southeast Missouri State University, Cape Girardeau, MO, USA
[2] Department of Mathematics, Louisiana State University, Baton Rouge, Louisiana, USA

hwang@semo.edu, hoffman@math.lsu.edu

key-words: Quaternion, curves, surfaces.

Abstract:
This paper investigates the use of quaternions in studying space curves and surfaces in affine 3-space. First, we generate a large variety of rational space curves and rational surfaces via quaternion multiplication by taking advantage the fact that quaternions represent space rotations. Then, we prove that the curvature and the torsion of a space curve can be computed by a quaternion function that is associated to this space curve. Finally, we show that the Gaussian and the mean curvature of a surface can also be computed by a quaternion function that is associated to this surface.

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Clinical Data Analysis for An Anti-Tuberculosis Treatment

Shishen Xie

Department of Mathematics and Statistics, University of Houston-Downtown, Houston, USA

XieS@uhd.edu, xieshishen@gmail.com

key-words: Clinical data, statistical analysis, hypothesis testing

Abstract:
In this presentation clinical data of an anti-tuberculosis treatment for both pulmonary and extrapulmonary patients is analyzed. Statistical analysis is performed to compare the baseline data and the data of treatment response in different stages of the treatment. The analysis result is used to quantitatively determine if there is significant progress during the treatment. Based on the data analysis, conclusions are drawn about the effectiveness of the treatment, and possible modifications of the treatment are discussed.

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Maurey-Rosenthal Type Theorems on Factorization Through L^p-spaces

Rachid Yahi

Department of mathematics, University of M'sila, Laboratory of Functional Analysis and Geometry of Spaces, Algeria

rachid.yahi@univ-msila.dz

key-words: Banach function spaces, Lipschitz operators, factorization of operators, , Maurey-Rosenthal theorem, Lipschitz p-convex operator.

Abstract:
There are many classical results relating inequalities for linear operators and factorizations. Probably, the ones that have found more applications are the nowadays called Maurey-Rosenthal theorems, and the associated inequalities for obtaining strong factorizations through L^p-spaces are the ones coming from p-convexity and p-concavity requirements for the operators of the spaces involved (see [1, 2, 3]).

In this talk we study the Lipschitz version of Maurey-Rosenthal theorems.

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The Inverse Limits of Dicompact Bi-Hausdorff Spaces

Filiz Yıldız

Department of Mathematics, Hacettepe University, Ankara, Turkey

yfiliz@hacettepe.edu.tr

key-words: Full subcategory, joint topology, inverse limit.

Abstract:
Inverse limits (also called projective limits [2,3]) are introduced and studied for some categories [1] of dicompact texture spaces, that is the ditopological spaces which are compact in the textural sense as a natural counterpart of classical compactness. By applying the classical approaches to texture theory [4], it is asked in the full subcategory of ifPDiComp$_{T2}$ consisting of dicompact Bi-Hausdorff texture spaces that whether the objects of ifPDiComp$_{T2}$ are characterized as a Hausdorff reflection of finite T0 spaces or not.

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An Extension of Korovkin Theorem Via $P-$Statistical $\mathcal{A}-$summation Process

Kamil Demirci[1], Fadime Dirik[1] and Sevda Yıldız[1]

[1] Department of Mathematics Sinop University Sinop, Turkey

kamild@sinop.edu.tr, fdirik@sinop.edu.tr, sevdaorhan@sinop.edu.tr

key-words: Korovkin type approximation, $\mathcal{A}-$summation process, rate of convergence, linear operators, statistical convergence with respect to power series method

Abstract:
The study of Korovkin-type theory is an area of active research, and it deals with approximation of continuous functions gives conditions in order to decide whether a sequence of positive linear operators converges to the identity operator [3]. The convergence is guaranteed on the whole space via test functions in these theorems. Recently, by relaxing the positivity condition on linear operators, various approximation theorems have been gotten [1, 2]. Also, Ünver and Orhan [5] have more recently introduced an interesting statistical type convergence named $P-$statistical convergence and they have proved Korovkin type theorem via this convergence method. In the present work, we study and prove Korovkin-type approximation theorems for linear operators defined on derivatives of functions by means of $\mathcal{A}-$summation process via statistical convergence with respect to power series method ($P-$statistical convergence). The main aim of using summability theory has been to make a non-convergent sequence convergent. Hence, if the classical or statistical convergence method does not work, then it would be beneficial to use the summability theory [4]. Then, we give an example that our theorem is stronger and we study the rate of convergence of these operators. Finally, we summarize our results and we show the importance of the study.

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Smoothing Levenberg-Marquardt Algorithm for Solving Non-Lipschitz Absolute Value Equations

Nurullah Yilmaz[1], Aysegul Kayacan[1]

[1] Department of Mathematics, Suleyman Demirel University, Isparta, Türkiye

nurullahyilmaz@sdu.edu.tr, aysegulkayacan98@gmail.com

key-words: Smoothing techniques, absolute value equations, non-Lipschitz functions, Levenberg-Marquardt algorithm.

Abstract:
In this study, we focus on solving the problem of non-Lipschitz absolute value equations (NAVE). A new Bezier curve based smoothing technique is introduced in smoothing process of the problem. By the help of the smoothing technique, a new Levenberg-Marquardt type algorithm is developed. The numerical experiments have been carried out on some randomly generated test problems. Finally, the comparison with other methods is illustrated to demonstrate the efficiency of the proposed algorithm.

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Adding Multicurves on Surfaces

S. Öykü Yurttaş

Department of Mathematics, Dicle University, Diyarbakr, Turkey

saadet.yurttas@dicle.edu.tr

key-words: Multicurves, surfaces, Dynnikov coordinates

Abstract:
A multicurve in a surface S is a finite union of pairwise disjoint unoriented essential simple closed curves in S, up to isotopy. Multicurves are usually described combinatorially using techniques such as the Dehn-Thurston coordinate system [2]. First, we shall explain what addition of two multicurves in S looks like illustrating it on the n-punctured disk D_n $(n \geq 3)$ making use of the Dynnikov coordinate system [1], which gives a bijection between the set of multicurves $\mathcal{L}_n \cup \{\emptyset\}$ and $\mathbb{Z}^{2n-4}$ (where $\{\emptyset\}$ corresponds to the empty multicurve). We shall show that there exists a group operation $\oplus$ on $\mathcal{L}_n$ in D_n such that the following diagram commutes therefore Dynnikov coordinates endow $\mathcal{L}_n \cup \{\emptyset\}$ with an abelian group structure.

$$\begin{tikzcd} \mathcal{L}_n \cup \{\emptyset\} \times \mathcal{L}_n \cup \{\emptyset\} \arrow[r, "\oplus"] \arrow[d, "\rho\times\rho"'] & \mathcal{L}_n \cup \{\emptyset\} \arrow[d, "\rho"'] \\ \mathbb{Z}^{2n-4} \times \mathbb{Z}^{2n-4} \arrow[r, "+"] & \mathbb{Z}^{2n-4} \end{tikzcd} \tag{29}$$

Then we shall explain generalized Dynnikov coordinates for multicurves on an n-punctured non-orientable surface N_n $(n \geq 1)$ [3, 4], and give an interpretation of a similar operation on the set $\mathfrak{L}_n$ of multicurves in N_n making use of generalized Dynnikov coordinates. We shall see that this operation works only for a certain subset of $\mathfrak{L}_n$, hence doesn't give a group operation on $\mathfrak{L}_n$.

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Generalized Difference Interval Matrix Definition and Some Interval Matrix Calculations

Zarife Zararsz[1] and Meliha Ceylan[1]

[1] Department of Mathematics, Nevehir Hac Bekta Veli University, Nevehir, Turkey

zarifezararsiz@nevsehir.edu.tr, baharyagmuru1909@hotmail.com

key-words: Generalized Difference Interval Matrix, Sequence Space, interval matrix operations

Abstract:
In this study; the operations of finding the cofactor of a matrix, calculating the transpose of a matrix, finding its adjoint, calculating the inverse of a matrix using adjoint (additional matrix) and inverting 2x2 type matrices according to multiplication are adapted to interval matrices. And examples are given of how matrix operations on these real numbers can be done in interval matrices using interval numbers. Besides, generalized difference interval null, generalized difference interval convergent and generalized difference interval bounded sequence spaces of interval numbers are defined. Furthermore, definition of infinite dimensional generalized difference matrix is introduced. Finally, an isomorphism is constructed on these interval sequence spaces.

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Jackknife Empirical Likelihood Inference for the Mean Difference of Two Zero-Inflated Skewed Populations

Yichuan Zhao[1] and Faysal Satter[1]

[1]Department of Mathematics and Statistics, Georgia State University, Atlanta, USA

yichuan@gsu.edu

key-words: Nonparametric method, U-statistic, positively skewed populations, Wilks' theorem..

Abstract:
In constructing a confidence interval for the mean difference of two independent populations, we may encounter the problem of having a low coverage probability when there are many zeros in the data, and the non-zero values are highly positively skewed. The violation of the normality assumption makes parametric methods ineficient in such cases. In this paper, motivated by [2] we propose jackknife empirical likelihood (JEL) method to construct a nonparametric confidence interval for the mean difference of two independent zero-inflated skewed populations. In order to improve the coverage probability, we develop adjusted jackknife empirical likelihood (AJEL) methods inspired by [1] and [3]. The JEL and AJEL confidence intervals are compared with the existing confidence intervals by normal approximation and empirical likelihood. Simulation studies are performed to assess the new methods. Two real-life datasets are also used as an illustration of the proposed methodologies.

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