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Editorial

Special Issue: Recent Trends on Pure and Applied Mathematics "Dedicated to Professor Hari Mohan Srivastava on the occasion of his 80th Birthday"

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Abstract

This paper presents brief summaries of the articles written on the topic of pure and applied mathematics and published in the Special Issue: Recent Trends on Pure and Applied Mathematics. Since this special issue is dedicated to Professor Hari Mohan Srivastava on the occasion of his 80th Birthday, this paper also includes a brief biography of Professor Hari Mohan Srivastava.

Keywords: Pure and Applied Mathematics, Mathematics in general, General applied mathematics

2010 MSC: 00A05, 00A69

The topics covered under the title "Recent Trends on Pure and Applied Mathematics" play an important role in many branches of Mathematics, Statistics and allied areas such as Engineering, Computer Science, Physics and Mathematical Physics, Economics, and also other related areas. This Special Issue deals with the theory and applications of Pure and Applied Mathematics. This Special Issue is dedicated to Professor Hari Mohan Srivastava on the occasion of his 80th Birthday, in recognition of his significant contributions in many different areas of Pure and Applied Mathematics.

As a co-worker and collaborator, Professor Srivastava is very kind, respectful, and genuinely helpful to almost everyone. Professor Srivastava is featured in written documents and websites where he has made outstanding contributions to hundreds of people, as well as thousands of single-authored and co-authored scientific journal articles, books and edited volumes in Pure and Applied Mathematics. For this reason, numerous conferences, journals and special books have been dedicated to Professor Srivastava so far. And, ever since the year 2015, Professor Srivastava has been listed as a Highly Cited Researcher by Clarivate Analytics [Thomson-Reuters] (Web of Science).

We, as editors, are honored and delighted to contribute to the preparation of this Special Issue dedicated to Professor Srivastava for its publication in the "Montes Taurus Journal of Pure and Applied Mathematics". We believe

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with our deepest feelings that, since our journal "Montes Taurus Journal of Pure and Applied Mathematics" aims to unite all scientists in the world and to "keep serving humanity" forever without compromising its scientific policy, not only this special issue. All of the other volumes of this journal will always serve all researchers dealing with scientific researches and endeavors.

1. Special Issue Information:

All manuscripts of this Special Issue in the *Montes Taurus Journal of Pure and Applied Mathematics* are dedicated to Professor Hari Mohan Srivastava on the occasion of his 80th Birthday. Professor Srivastavas scholarship, global impact, professional contributions, and many friendships and collaborations deserve celebrating! We, as editors, are appreciative to be able to write this article in Professor Hari Mohan Srivastava's honor. We are also honored to thank him most sincerely for his remarkably outstanding contributions to many different areas of Pure and Applied Mathematics.

Hari Mohan Srivastava was born on 05 July 1940 in Karon (District Ballia) in the Province of Uttar Pradesh in India. Professor Hari Mohan Srivastava began his university-level teaching career right after having received his M.Sc. degree in 1959 at the age of 19 years. He earned his Ph.D. degree in 1965 while he was a full-time member of the teaching faculty at the Jai Narain Vyas University of Jodhpur in India (since 1963). Currently, Professor Srivastava holds the position of Professor Emeritus in the Department of Mathematics and Statistics at the University of Victoria in Canada, having joined the faculty there in 1969, first as Associate Professor (1969-1974) and then as Full Professor (1974-2006). Professor Srivastava has held (and continues to hold) numerous Visiting and Chair Professorships at many universities and research institutes in many different parts of the world. Having received several D.Sc. (*honoris causa*) degrees as well as honorary memberships and fellowships of many scientific academies and scientific societies around the world, he is also actively associated editorially with numerous international scientific research journals as an Honorary or Advisory Editor or as an Editorial Board Member. He has edited (and is currently editing) many Special Issues of scientific research journals as the Lead Guest Editor, including (for example) the MDPI journals, *Axioms*, *Mathematics*, *Symmetry*, *Journal of Risk and Financial Management*, and *Fractal and Fractional*, the Elsevier journals, *Journal of Computational and Applied Mathematics* and *Applied Mathematics and Computation*, the Wiley journal, *Mathematical Methods in the Applied Sciences*, and as Guest Editor of such other journals as (for example) *Abstract and Applied Analysis*, *Advances in Mathematical Physics*, *Filomat*, *Chaos*: *An Interdisciplinary Journal of Nonlinear Science*, *Chaos Solitons & Fractals*, *Applied and Computational Mathematics*, *Journal of Nonlinear and Convex Analysis*, *Alexandria Engineering Journal*, *Tbilisi Mathematical Journal*, *Journal of King Saud University – Science*, *AIMS Mathematics*, and so on. He indeed is a Clarivate Analytics [Thomson Reuters] (Web of Science) Highly-Cited Researcher.

Professor Srivastava's research interests include several areas of pure and applied mathematical sciences, such as (for example) Real and Complex Analysis, Fractional Calculus and Its Applications, Integral Equations and Integral Transforms, Higher Transcendental Functions and Their Applications, q-Series and q-Polynomials, Analytic Number Theory, Analytic and Geometric Inequalities, Probability and Statistics, and Inventory Modeling and Optimization. He has published 36 books, monographs, and edited volumes, 36 book (and encyclopedia) chapters, 48 papers in international conference proceedings, and more than 1350 peer-reviewed international scientific research journal articles, as well as Forewords and Prefaces to many books and journals.

Further details about Professor Srivastava's professional achievements and scholarly accomplishments, as well as honors, awards and distinctions, can be found at the following website: `http://www.math.uvic.ca/~harimsri/` This Special Issue aims to deal essentially with the theory and applications of the areas developed and advanced by **Professor Hari Mohan Srivastava** and his research collaborators, colleagues and associates.

2. Special Issue Overview:

The Special Issue contains 30 contributions in Pure and Applied Mathematics. We now highlight the main results involving abstracts of the following manuscripts:

- In [1], the authors introduce a unified family of Apostol-Bernoulli based poly-Daehee polynomials. Then the authors provide a number of formulas involving these unified polynomials such as differential formulas, addition formulas, summation formulas, and an implicit summation formula. The identities presented in [1], being general, are pointed out to yield the corresponding formulas associated with relatively simple polynomials. Further the authors provide several other polynomials similar to these unified polynomials.

- In [2], the author gives some results associated with Hurwitz-Lerch zeta function with order 1 which is special case of Hurwitz-Lerch zeta function. One of the results is the integral formula including Hurwitz-Lerch zeta function with order 1. The other result is a corollary generated by integral representation of Hurwitz-Lerch zeta function with order 1.

- In [3], the authors introduce a new subclass of analytic and bi-univalent functions associated with Janowski functions. Using the Faber polynomial expansions, the authors determine a general coefficient bounds $|a_n|$ for $n \geq 3$ for this newly defined class. Relevant connections of the results presented in [3] with those in a number of other related works on this subject are also pointed out.

- In [4], the authors analysed the competing risks data using cause specific hazard approach. The authors proposed the Cox proportional hazards regression technique of analyzing the survival data in the presence of competing risks setting using baseline modified Weibull distribution. For estimating the cumulative cause specific hazard function the authors used maximum likelihood as well Bayesian methods of estimation. Under Bayesian scenario, the authors used three types of informative priors such as gamma, Weibull and log-normal for baseline parameters and standard normal prior for regression parameters. The Comparison of Bayes estimates is made based on two different loss functions like, squared error and LINEX loss functions. Simulation study shows the appropriate convergence and identifiability of the proposed model. The bladder cancer data is utilized for the validation of proposed study.

- In [5], a family $\mathcal{R}$ of binary relations on a set X is called a relator on X, and the ordered pair $X(\mathcal{R}) = (X, \mathcal{R})$ will be called a relator space. Each generalized topology $\mathcal{T}$ on X can be easily derived from the family $\mathcal{R}_{\mathcal{T}}$ of all Pervin's preorder relations $R_V = V^2 \cup V^c \times X$ with $V \in \mathcal{T}$. For a subset A of the relator space $X(\mathcal{R})$, the authors of [5] state that

$$A^- = \mathrm{cl}_{\mathcal{R}}(A) = \bigcap \{ R^{-1}[A] : \quad R \in \mathcal{R} \},$$

$A^\circ = \mathrm{int}_{\mathcal{R}}(A) = \mathrm{cl}_{\mathcal{R}}(A^c)^c$ and $A^\dagger = \mathrm{res}_{\mathcal{R}}(A) = \mathrm{cl}_{\mathcal{R}}(A) \setminus A$ may briefly be defined. The authors of [5] also state that

$$\mathcal{T}_{\mathcal{R}} = \{ A \subseteq X : \quad A \subseteq A^\circ \},$$

$$\mathcal{D}_{\mathcal{R}} = \{ A \subseteq X : \quad A^- = X \} \text{ and } \mathcal{N}_{\mathcal{R}} = \{ A \subseteq X : \quad A^{-\circ} = \emptyset \}$$

may naturally be defined as well now. Moreover, following some basic definitions in topological spaces, a subset A of the relator space $X(\mathcal{R})$ may, for instance, be naturally called topologically

(1) regular open if $A = A^{-\circ}$;

(2) preopen if $A \subseteq A^{-\circ}$;

(3) semi-open if $A \subseteq A^{\circ-}$;

(4) α–open if $A \subseteq A^{\circ-\circ}$;

(5) β–open if $A \subseteq A^{-\circ-}$;

(6) quasi-open if there exists $V \in \mathcal{T}_{\mathcal{R}}$ such that $V \subseteq A \subseteq V^-$;

(7) pseudo-open if there exists $V \in \mathcal{T}_{\mathcal{R}}$ such that $A \subseteq V \subseteq A^-$.

And, the family of all such subsets A of $X(\mathcal{R})$ may, for instance, be naturally denoted by $\mathcal{T}_{\mathcal{R}}^{\kappa}$ with $\kappa = r$, p, s, α, β, q and ps, respectively.

In [5], the authors are mainly interested in the relationships and characterizations of the families $\mathcal{T}_{\mathcal{R}}^{\kappa}$. For instance, the authors of [5] shall prove the following assertions:

(1) If $\mathcal{R}$ is topological, then $\mathcal{T}_{\mathcal{R}}^{s} = \mathcal{T}_{\mathcal{R}}^{q}$. Moreover, $A \in \mathcal{T}_{\mathcal{R}}^{s}$ if and only if $A = V \cup B$ for some $V \in \mathcal{T}_{\mathcal{R}}$ and $B \subseteq V^{\dagger}$.

(2) If $\mathcal{R}$ is topological, then $\mathcal{T}_{\mathcal{R}}^{p} = \mathcal{T}_{\mathcal{R}}^{ps}$. Moreover, if, in addition $\mathcal{R}$ is topologically filtered, then $A \in \mathcal{T}_{\mathcal{R}}^{p}$ if and only if $A = V \cap B$ for some $V \in \mathcal{T}_{\mathcal{R}}$ and $B \in \mathcal{D}_{\mathcal{R}}$;

(3) If $\mathcal{R}$ is topological, then $\mathcal{T}_{\mathcal{R}}^{\alpha} = \mathcal{T}_{\mathcal{R}}^{s} \cap \mathcal{T}_{\mathcal{R}}^{p}$. Moreover, if in addition $\mathcal{R}$ is topologically filtered, then $A \in \mathcal{T}_{\mathcal{R}}^{\alpha}$ if and only if $A = V \setminus B$ for some $V \in \mathcal{T}_{\mathcal{R}}$ and $B \in \mathcal{N}_{\mathcal{R}}$.

In [5], set-theoretic properties and some proximal and paratopological counterparts of the families $\mathcal{T}_{\mathcal{R}}^{\kappa}$ are investigated in some subsequent papers.

- The main motive of [6] is to present a new class of generalized integral formulae which involve a generating function of two variables $G(u, x)$. By this approach the authors deduce a set of new outcomes, which are integrals associated with generalized hypergeometric function, Laguerre, Hermite and Bessel polynomials, Kampé de Fériet hypergeometric series of two variables, Lauricella function and several special cases of our main results.

- In [7], the authors define some new subclasses $\mathcal{S}^{*}(c, p, \lambda, m, \delta, \alpha, \beta)$ and $\mathcal{K}(c, p, \lambda, m, \delta, \alpha, \beta)$ of strongly starlike and strongly convex functions of order α and type β by using the generalized linear operator $\mathcal{L}_{c,p,\lambda}^{m,\delta}$. The authors also derive some interesting properties, such as inclusion relationships of these classes and the integral operator $J_{\mu,p}$.

- Let $ba(\mathcal{A})$ be the Banach space of the real (or complex) finitely additive measures of bounded variation defined on an algebra $\mathcal{A}$ of subsets of Ω and endowed with the variation norm. A subset $\mathcal{B}$ of $\mathcal{A}$ is a Nikodým set for $ba(\mathcal{A})$ if each $\mathcal{B}$-pointwise bounded subset M of $ba(\mathcal{A})$ is uniformly bounded on $\mathcal{A}$ and $\mathcal{B}$ is a strong Nikodým set for $ba(\mathcal{A})$ if each increasing covering $(\mathcal{B}_m)_{m=1}^{\infty}$ of $\mathcal{B}$ contains a $\mathcal{B}_n$ which is a Nikodým set for $ba(\mathcal{A})$. If, additionally, the Nikodým subset $\mathcal{B}$ verifies that the sequential $\mathcal{B}$-pointwise convergence in $ba(\mathcal{A})$ implies weak convergence then $\mathcal{B}$ has the Vitali-Hahn-Saks property, (VHS) in brief, and $\mathcal{B}$ has the strong (VHS) property if for each increasing covering $(\mathcal{B}_m)_{m=1}^{\infty}$ of $\mathcal{B}$ there exists $\mathcal{B}_q$ that has (VHS) property. Motivated by Valdivia result that every σ-algebra has strong Nikodým property and by his 2013 open question concerning that if Nikodým property in an algebra of subsets implies strong Nikodým property, in [8], the authors survey this Valdivia theorem and get that in a strong Nikodým set the (VHS) property implies the strong (VHS) property.

- Let ω_1 and ω_2 be weight functions on $\mathbb{R}$. In [9], the authors define $\left(FW_{\omega_1,\omega_2}^{\theta,p,q}\right)_a(\mathbb{R})$ to be the vector space of $f \in L_{\omega_1}^{p}(\mathbb{R})$ such that the fractional wavelet transform $W_{\psi}^{\theta} f$ belongs to $L_{\omega_2}^{q}(\mathbb{R})$ for $1 \leq p, q < \infty$. The authors endow this space with a sum norm and show that $\left(FW_{\omega_1,\omega_2}^{\theta,p,q}\right)_a(\mathbb{R})$ becomes a Banach space. Also the authors prove that $\left(FW_{\omega_1,\omega_2}^{\theta,p,q}\right)_a(\mathbb{R})$ is an essential Banach Module over $L_{\omega_1}^{1}(\mathbb{R})$ under some conditions. The authors obtain its approximate identities, dual space and multipliers space. At the end of [8] the authors discuss the inclusion properties, compact embeddings of these spaces.

- In [10], the author give the intact results for the contour integral of the rational functions in series of the complete Bell polynomials. As applications, the author show several interesting examples for the contour integral of the improper rational functions.

- Recently, degenerate Bell numbers and polynomials were introduced as degenerate versions of the ordinary Bell numbers and polynomials. In [11], the authors consider reciprocal degenerate Bell numbers and polynomials whose generating function is the reciprocal of that of the degenerate Bell polynomials. The authors investigate some properties for those numbers and polynomials, including their explicit expressions, recurrence relations and their connections with the degenerate Bell numbers and polynomials.

- In [12], the authors find the necessary and sufficient conditions, inclusion relations for Mittag-Leffler-type Poisson distribution series belonging to the classes $\mathcal{S}^{*}(\zeta, \delta)$ and $\mathcal{C}^{*}(\zeta, \delta)$. Further, the authors consider an integral operator related to Mittag-Leffler-type Poisson distribution series.

- The aim of [13] is to provide four unified results of reducibility of the Srivastava's triple hypergeometric series H_B. The results are obtained with the help of two general results involving products of generalized hypergeometric series due to Rathie et al. A few known as well as unknown results follow as special cases of our main findings.

- Several lattice structures that can be thought as graphs are useful in the study of large networks. In [14], the authors study 15 topological graph indices from the class of Zagreb indices of some interesting lattice structures called snake graphs. The authors use vertex and edge partitions of these graphs and calculate their indices by means of these partitions.

- In [15], sharp upper bounds for the coefficient functional $|b_{2k+1} - \mu b_{k+1}^2|$ corresponding to the k^{th} transformation ofcertain normalized analytic function $f(z) = z + \sum_{n=2}^{\infty} a_n z^n$ defined on the unit disk Δ in the complex plane where the function $f(z)$ belong to certain subclasses of starlike and convex functions with respect to symmetric points are obtained. Further, Fekete-Szegö inequalities for the functionz $\frac{z}{f(z)}$ and the inverse function f for the above mentioned classes are investigated and pointed out the special cases as remark.

- In [16], the authors obtain analytical solutions of Laplace transform based some generalized class of the hyperbolic integrals in terms of hypergeometric functions ${}_3F_2(\pm1)$, ${}_4F_3(\pm1)$, ${}_5F_4(\pm1)$, ${}_6F_5(\pm1)$, ${}_7F_6(\pm1)$ and ${}_8F_7(\pm1)$ with suitable convergence conditions, by using some algebraic properties of Pochhammer symbols. In addition, reduction formulas for ${}_4F_3(1)$, ${}_7F_6(-1)$ and some new summation theorems (not recorded earlier in the literature of hypergeometric functions) for ${}_3F_2(-1)$, ${}_6F_5(\pm1)$, ${}_7F_6(\pm1)$ and ${}_8F_7(\pm1)$ are obtained.

- In [17], the author have introduced and studied the subclass $\mathcal{D}_{m,n}(\delta, \lambda, d, \gamma, \beta)$ using the fractional integral operator associated with alinear differential operator. The main object of [17] is to investigate several properties such as coefficient estimates, distortion theorems, closure theorems, neighborhoods and the radii of starlikeness, convexity and close-to-convexity of functions belonging to the class $\mathcal{D}_{m,n}(\delta, \lambda, d, \gamma, \beta)$.

- The purpose of [18] is to investigate argument properties of Carathéodory functions applying the result obtained by Nunokawa *et al.*. The authors also obtain some geometric properties of analytic functions as special cases.

- In [19], the authors obtain analytical solution of an unsolved integral $\mathbf{R}_S(m,n)$ of Srinivasa Ramanujan, using hypergeometric approach, Mellin transforms, Infinite Fourier sine transforms, Infinite series decomposition identity and some algebraic properties of Pochhammer's symbol. Also the authors have given some generalizations of the Ramanujan's integral $\mathbf{R}_S(m,n)$ in the form of integrals $\mathbf{I}_S^*(\upsilon, b, c, \lambda, y)$, $\mathbf{J}_S(\upsilon, b, c, \lambda, y)$, $\mathbf{K}_S(\upsilon, b, c, \lambda, y)$, $\mathbf{I}_S(\upsilon, b, \lambda, y)$ and solved them in terms of ordinary hypergeometric functions ${}_2F_3$, with suitable convergence conditions. Moreover as applications of Ramanujans integral $\mathbf{R}_S(m,n)$, the new three infinite summation formulas associated with hypergeometric functions ${}_1F_2$ and ${}_0F_1$ (or cosine, sine and Lommel functions) are obtained.

- Water engineering is a real-live study that combines engineering and non-engineering factors that are realized for operating water schemes. These facets and the connected problems applying various procedures. In [20], the author formulates a new type of the chi-square distributions, which is given in terms of the local fractional integral (fractal integral operator). This concept is a special part of fractional calculus. Then the fractal chi-square will employ to generalize Tsallis entropy. These types of entropy have been seen innumerous applications in almost all the sciences, including the social sciences and humanities studies. The author schemes a unique form of the fractal Tsallis entropy using fractal chi-square test. A test method is talented of studying water engineering modeling.

- In [21], the authors derive various identities involving the negative higher-order combinatorial numbers and polynomials and other kinds of special numbers and polynomials such as the Stirling numbers, the Lah numbers, the negative higher-order Changhee numbers and polynomials, and the positive higher-order Bernoulli numbers and polynomials. Furthermore, by using the integral formulas of not only the negative higher-order combinatorial numbers and polynomials but also their generating functions, the authors obtain some identities and combinatorial sums. The authors give some infinite series, involving the negative higher-order combinatorial numbers, with their values in terms of the falling factorials, the Catalan numbers, the Daehee numbers (linear combination of the Stirling numbers and the Bernoulli numbers) and the Changhee numbers (linear combination of the Stirling numbers and the Euler numbers). As application of these infinite series, the authors also set two new sequences of special numbers with their generating functions, and investigate their properties. The authors pose an open question related to one of these number sequences. By using an infinite series arising from the integral of the generating functions for the negative higher-order combinatorial numbers and polynomials, the authors also introduce a new family of polynomials associated with the Bernstein basis functions. In addition, the authors derive symmetry property, integral formulas and derivative formula for these newly introduced polynomials. Moreover, by implementing an explicit formula of these newly introduced polynomials in Mathematica with the aid of the Wolfram programming language, the authors present some plots of these newly introduced polynomial functions for some of their randomly selected special cases. The authors also give some further results including series representations, combinatorial sums, integral formulas and relations for some of combinatorial numbers and poynomials. Finally, the authors present some observations and comments on our results.

- The main objective of [22] is to add twelve new transformations formulas for the Gauss hypergeometric function having higher-order rational arguments than those recently obtained by Tremblay [*New Quadratic Transformations of Hypergeometric Functions and Associated Summation Formulas Obtained with the Well-Poised Fractional Calculus Operator*, Montes Taurus J. Pure Appl. Math. 2 (1), 36-62, 2020] and Tremblay and Gaboury [*Well-posed fractional calculus: Obtaining new transformations formulas involving Gauss hypergeometric functions with rational quadratic, cubic and higher degree arguments*, Math. Meth. Appl. Sci. 13, 4967-4985, 2018]. These transformation formulas are obtained with a new systematic method applied to known formulas, most of which come from the Goursat thesis published in 1881 [*Sur l'Équation différentielle linéaire qui admet pour intégrale la série hypergéométrique*, Annales scientifiques de l'É. N. S., 2e série tome 10 (1881), 3-142]. The method used is based on the use of the fractional operator ${}_{g(z)}O_{\beta}^{\alpha}$ called 'well-poised fractional calculus operator' introduced a long time ago by Tremblay [*Une contribution à la théorie de la dérivée fractionnaire*, Doctoral thesis, Université Laval, Québec, Canada (1974)]. After presenting the definition and a short list of these properties of the operator ${}_{g(z)}O_{\beta}^{\alpha}$, the author gives an detailed example of calculations to obtain this type of transformation.

- In [23], the author uses the homogeneous q-operators [J. Differ. Equ. Appl. 20 (2014), 837-851] to derive Rogers formulas, extended Rogers formulas and Srivastava-Agarwal type bilinear generating functions for Cigler's polynomials [J. Differ. Equ. Appl. 24 (2018), 479-502]. Finally, the author also derives two interesting transformation formulas between ${}_2\Phi_1$, ${}_2\Phi_2$ and ${}_3\Phi_2$.

- In [24], the authors use a power series with coefficients are the probabilities of Poisson distribution and obtain sufficient conditions for this power series and some related series to be in various subclasses of harmonic functions. Also, the authors investigate several mapping properties involving these subclasses.

- The purpose of [25] is to consider coefficient estimates in a class of functions $\mathscr{M}_{\alpha,\lambda}(q)$ consisting of analytic functions f normalized by $f(0) = f'(0) - 1 = 0$ in the open unit disk

$$\Delta = \{z : z \in \mathbb{C} \quad \text{and} \quad |z| < 1\},$$

subordinating with leaf like domain, to derive certain coefficient estimates a_2, a_3 and Fekete-Szegö inequality for $f \in \mathscr{M}_{\alpha,\lambda}(q)$. A similar results have been done for the inverse function f^{-1}. Further application of the results of [25] to certain functions defined by convolution products with a normalized functions analytic is given, and in particular, the author obtains Fekete-Szegö inequalities for certain subclasses of functions defined through Poisson distribution series.

- In [26], certain decomposition formulas associated with a number of simple and multiple Gaussian hypergeometric functions including the multiple Lauricella hypergeometric functions have been presented. The authors of [26] aim to establish further new decomposition formulas involving the multiple Lauricella hypergeometric functions $F_A^{(n)}$ and $F_B^{(n)}$.

- The main target of [27] is the Frankl-type problem for mixed type equation with the Liouville-Caputo-like counter part hyper-Bessel fractional derivative. The author proves a unique solvability of this problem under certain conditions on given data. For this aim, the author uses energy integrals (for the uniqueness) and method of integral equations (for the existence).

- According to [28], the symmetry group of a differential equation is the group of transformations which transform solutions of the differential equation to solutions. For systems of partial differential equations, the symmetry group can be used to explicitly find particular types of solutions that are themselves invariant with respect to some subgroup of the full group of symmetries of the system. Group-theoretic analysis methods are widely used to study partial differential equations and to integrate ordinary differential equations. The heat equation is a certain partial differential equation and the most widely studied equation in pure mathematics, and its analysis is regarded as fundamental to the broader field of partial differential equations. In [28], the authors find solutions of the two-dimensional heat equation which are invariant with respect some symmetry groups and show that some solutions can be found using the well-known Bessel functions.

- The work [29] considers a family of cyclic (non-cyclic) relatively Geraghty type condensing functions and primarily aims to study the existence of (coupled) points and pairs of best proximity in Banach spaces. The occurrence of optimal solutions for a system of non-local integro-differential equations is demonstrated as an application. As numerical illustrations, the authors of [29] present the optimal solution of integro-differential systems (type cell growth), which can be optimized by using fractal entropy (the measurement of complexity). The fractal power is playing an important role to state the stability and maximization of solutions.

- The main purpose of [30] is to investigate a common fixed point theorem in bicomplex valued b-metric space satisfying some rational inequalities for two pairs of weakly compatible self contracting mappings and to extend the result obtained by Azam et al. [*Common fixed point theorems in complex valued metric spaces*, Numer. Funct. Anal. Optim. 32 (3), 243-253, 2011]. The result of [30] is the generalisation of the result of Mitra [*A common fixed point theorem in complex valued b-metric spaces*, Internat. J. Adv. Sci. Tech. Res. 4 (5), 504-548, 2015] and the application of Banach contraction principle. Also the authors use the concepts of Choi et al. [*Some common fixed point theorems in connection with two weakly compatible mappings in bicomplex valued metric spaces*, Honam Mathematical J. 39 (1), 115-126, 2017] and Datta et al. [*Some common fixed point theorems for contracting mappings in bicomplex-valued b-metric spaces*, Bull. Cal. Math. Soc. 112 (4), 329-354, 2020].

Acknowledgements

This paper is dedicated to Professor Hari Mohan Srivastava on the occasion of his 80th Birthday.

References

[1] T. Usman, N. Khan, M. Saif and J. Choi, *A Unified Family of Apostol-Bernoulli Based Poly-Daehee Polynomials*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 1-11, 2021; Article ID: MTJPAM-D-20-00009.

[2] A. A. Aygunes, *An Integral Formula Generated by Hurwitz-Lerch Zeta Function with Order 1*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 12-16, 2021; Article ID: MTJPAM-D-20-00029.

[3] N. Khan, Q. Z. Ahmad, S. Khan and B. Khan, *The Faber Polynomial Expansion Method for a Subclass of Analytic and Bi-Univalent Functions Associated with the Janowski Functions*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 17-24, 2021; Article ID: MTJPAM-D-20-00006.

[4] N. Chandra and H. Rehman, *On the Estimation of Parametric Cause Specific Hazard Function with Bayesian Approach under Informative Priors*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 25-38, 2021; Article ID: MTJPAM-D-20-00025.

[5] T. M. Rassias, M. M. Salih and Á. Száz, *Characterizations of Generalized Topologically Open Sets in Relator Spaces*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 39-94, 2021; Article ID: MTJPAM-D-20-00046.

[6] M. Ali, M. Ghayasuddin and T. K. Pogány, *Integrals with Two–Variable Generating Function in the Integrand*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 95-103, 2021; Article ID: MTJPAM-D-20-00048.

[7] M. K. Aouf and S. El-Deeb, *On p-Valent Strongly Starlike and Strongly Convex Functions Associated with Generalized Linear Operator*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 104-111, 2021; Article ID: MTJPAM-D-20-00023.

[8] S. López-Alfonso, M. López-Pellicer and J. Mas, *A Survey on Nikodým and Vitali-Hahn-Saks Properties*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 112-121, 2021; Article ID: MTJPAM-D-20-00058.

[9] M. Duman and O. Kulak, *On Function Spaces with Fractional Wavelet Transform*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 122-134, 2021; Article ID: MTJPAM-D-20-00045.

[10] Q.-M. Luo, *Contour Integration for the Improper Rational Functions*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 135-139, 2021; Article ID: MTJPAM-D-20-00039.

[11] T. Kim and D. S. Kim, *A Note on Reciprocal Degenerate Bell Numbers and Polynomials*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 140-146, 2021; Article ID: MTJPAM-D-20-00047.

[12] B. A. Frasin, S. Porwal and F. Yousef, *Subclasses of Starlike and Convex Functions Associated with Mittag-Leffler-type Poisson Distribution Series*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 147-154, 2021; Article ID: MTJPAM-D-20-00044.

[13] G. V. Milovanović and A. K. Rathie, *Four Unified Results for Reducibility of Srivastava's Triple Hypergeometric Series H_B*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 155-164, 2021; Article ID: MTJPAM-D-20-00062.

[14] P. Mahalank, B. K. Majhi, S. Delen and I. N. Cangul, *Zagreb Indices of Square Snake Graphs*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 165-171, 2021; Article ID: MTJPAM-D-20-00056.

[15] T. Panigrahi, G. Murugusundaramoorthy and S. K. Mohapatra, *Fekete-Szegö Problems for the k^{th} Root Transform of Subclasses of Starlike and Convex Functions with Respect to Symmetric Points*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 172-181, 2021; Article ID: MTJPAM-D-20-00054.

[16] M. I. Qureshi and S. A. Dar, *Some Hypergeometric Summation Theorems and Reduction Formulas via Laplace Transform Method*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 182-199, 2021; Article ID: MTJPAM-D-20-00016.

[17] A. L. Alina, *About a Subclass of Analytic Functions Defined by a Fractional Integral Operator*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 200-210, 2021; Article ID: MTJPAM-D-20-00037.

[18] S. H. An and N. E. Cho, *Argument Estimates for Carathéodory Functions with Applications*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 211-215, 2021; Article ID: MTJPAM-D-20-00055.

[19] M. I. Qureshi and S. A. Dar, *Generalizations and Applications of Srinivasa Ramanujan's Integral $\boldsymbol{R}_S(m,n)$ via Hypergeometric Approach and Integral Transforms*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 216-226, 2021; Article ID: MTJPAM-D-20-00026.

[20] R. W. Ibrahim, *Water Engineering Modeling Controlled by Generalized Tsallis Entropy*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 227-237, 2021; Article ID: MTJPAM-D-20-00040.

[21] I. Kucukoglu and Y. Simsek, *New Formulas and Numbers Arising from Analyzing Combinatorial Numbers and Polynomials*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 238-259, 2021; Article ID: MTJPAM-D-20-00038.

[22] R. Tremblay, *Using the Well-Poised Fractional Calculus Operator ${}_{g(z)}O_{\beta}^{\alpha}$ to obtain transformations of the Gauss hypergeometric function with higher level arguments*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 260-283, 2021; Article ID: MTJPAM-D-20-00057.

[23] S. Arjika, *Certain Generating Functions for Cigler's Polynomials*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 284-296, 2021; Article ID: MTJPAM-D-20-00027.

[24] R. M. El-Ashwah and W. Y. Kota, *Connections between Various Subclasses of Uniformly Harmonic Starlike Mappings and Poisson Distribution Series*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 297-304, 2021; Article ID: MTJPAM-D-20-00032.

[25] G. Murugusundaramoorthy, *Fekete-Szegö Inequalities for Certain Subclasses of Analytic Functions Related with Leaf-Like Domain*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 305-316, 2021; Article ID: MTJPAM-D-20-00042.

[26] A. Hasanov and T. G. Ergashev, *New Decomposition Formulas Associated with the Lauricella Multivariable Hypergeometric Functions*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 317-326, 2021; Article ID: MTJPAM-D-20-00049.

[27] B. Toshtemirov, *Frankl-Type Problem for a Mixed Type Equation Associated Hyper-Bessel Differential Operator*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 327-333, 2021; Article ID: MTJPAM-D-20-00053.

[28] M. Aripov and O. Narmanov, *Some Invariant Solutions of Two Dimensional Heat Equation*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 334-343, 2021; Article ID: MTJPAM-D-20-00060.

[29] P. R. Patle, D. Gopal and R. W. Ibrahim, *Cyclic and Noncyclic Geraghty Type Condensing Operators and Optimal Solutions of Nonlocal Integro-Differential Equations*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 344-357, 2021; Article ID: MTJPAM-D-20-00061.

[30] S. K. Datta, D. Pal, R. Sarkar and A. Manna, *On a Common Fixed Point Theorem in Bicomplex Valued b-metric Space*, Montes Taurus J. Pure Appl. Math. **3 (3)**, 358-366, 2021; Article ID: MTJPAM-D-20-00017.