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Abdulwasea Alkhazzan, Wadhah Al-Sadi, Varaporn Wattanakejorn, Hasib Khan, Thanin Sitthiwirattam, Sina Etemad, Shahram Rezapour

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## A new class of ratio type estimators in single- and two-phase sampling (/article/doi/10.3934/math.2022783)

Amber Yousaf Dar, Nadia Saeed, Moustafa Omar Ahmed Abu-Shawiesh, Saman Hanif Shahbaz, Muhammad Qaiser Shahbaz

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Yasir Nawaz, Muhammad Shoaib Arif, Wasfi Shatanawi, Muhammad Usman Ashraf

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Effect of immigration in a predator-prey system: Stability, bifurcation and chaos (/article/doi/10.3934/math.2022791)

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Qualitative theory and approximate solution to a dynamical system under modified type Caputo-Fabrizio derivative (/article/doi/10.3934/math.2022792)

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Existence theory and generalized Mittag-Leffler stability for a nonlinear Caputo-Hadamard FIVP via the Lyapunov method (/article/doi/10.3934/math.2022794)

Hadjer Belbali, Maamar Benbachir, Sina Etemad, Choonkil Park, Shahram Rezapour

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 14419-14433. doi: 10.3934/math.2022794 (<https://doi.org/10.3934/math.2022794>)

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## Dynamical analysis of a stochastic hybrid predator-prey model with Beddington-DeAngelis functional response and Lévy jumps (/article/doi/10.3934/math.2022799)

Hong Qiu, Yanzhang Huo, Tianhui Ma

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Linear Diophantine fuzzy graphs with new decision-making approach (/article/doi/10.3934/math.2022801)

Muhammad Zeeshan Hanif, Naveed Yaqoob, Muhammad Riaz, Muhammad Aslam

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 14532-14556. doi: 10.3934/math.2022801 (<https://doi.org/10.3934/math.2022801>)

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Integrated decision-making methods based on 2-tuple linguistic  $m$ -polar fuzzy information (/article/doi/10.3934/math.2022802)

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2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 14614-14630. doi: 10.3934/math.2022804 (<https://doi.org/10.3934/math.2022804>)

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## Some coupled fixed point theorems on multiplicative metric spaces with an application (/article/doi/10.3934/math.2022805)

Baqir Hussain, Saif Ur Rehman, Mohammed M.M. Jaradat, Sami Ullah Khan, Muhammad Arshad

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 14631-14651. doi: 10.3934/math.2022805 (<https://doi.org/10.3934/math.2022805>)

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Xueqi Wen, Zhi Li

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## Optimal harvesting for a periodic competing system with size structure in a polluted environment (/article/doi/10.3934/math.2022808)

Tainian Zhang, Zhixue Luo

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## The generalized 4-connectivity of folded Petersen cube networks (/article/doi/10.3934/math.2022809)

Huifen Ge, Shumin Zhang, Chengfu Ye, Rongxia Hao

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## The Cauchy problem for coupled system of the generalized Camassa-Holm equations (/article/doi/10.3934/math.2022810)

Sen Ming, Jiayi Du, Yaxian Ma

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 14738-14755. doi: 10.3934/math.2022810 (<https://doi.org/10.3934/math.2022810>)

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## Some fixed point results for $\xi$ -chainable neutrosophic and generalized neutrosophic cone metric spaces with application (/article/doi/10.3934/math.2022811)

Muhammad Riaz, Umar Ishtiaq, Choonkil Park, Khaleel Ahmad, Fahim Uddin

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 14756-14784. doi: 10.3934/math.2022811 (<https://doi.org/10.3934/math.2022811>)

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## A new fuzzy decision support system approach; analysis and applications (/article/doi/10.3934/math.2022812)

Hifza, Muhammad Gulistan, Zahid Khan, Mohammed M. Al-Shamiri, Muhammad Azhar, Asad Ali, Joseph David Madasi

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 14785-14825. doi: 10.3934/math.2022812 (<https://doi.org/10.3934/math.2022812>)

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## Phase noise optimization of integrated ring voltage-controlled oscillators by metaheuristics (/article/doi/10.3934/math.2022813)

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2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 14826-14839. doi: 10.3934/math.2022813 (<https://doi.org/10.3934/math.2022813>)

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## Picture fuzzy topological spaces and associated continuous functions (/article/doi/10.3934/math.2022814)

Abdul Razaq, Ibtisam Masmali, Harish Garg, Umer Shuaib

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 14840-14861. doi: 10.3934/math.2022814 (<https://doi.org/10.3934/math.2022814>)

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## Some fixed point results via auxiliary functions on orthogonal metric spaces and application to homotopy (/article/doi/10.3934/math.2022815)

Nurcan Bilgili Gungor

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## Basins of attraction in a modified ratio-dependent predator-prey model with prey refugee (/article/doi/10.3934/math.2022816)

Khairul Saleh

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 [Abstract \(/article/id/62a323e3ba35de15514969cd\)](/article/id/62a323e3ba35de15514969cd)  [HTML \(/article/doi/10.3934/math.2022816?viewType=HTML\)](/article/doi/10.3934/math.2022816?viewType=HTML)

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Shaoyuan Xu, Yan Han, Suzana Aleksić, Stojan Radenović

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## A novel formulation of the fuzzy hybrid transform for dealing nonlinear partial differential equations via fuzzy fractional derivative involving general order (/article/doi/10.3934/math.2022819)

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2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 14946-14974. doi: 10.3934/math.2022819 (<https://doi.org/10.3934/math.2022819>)

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## Semi-analytical and numerical computation of fractal-fractional sine-Gordon equation with non-singular kernels (/article/doi/10.3934/math.2022820)

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2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 14975-14990. doi: 10.3934/math.2022820 (<https://doi.org/10.3934/math.2022820>)

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## On the linearized system of elasticity in the half-space (/article/doi/10.3934/math.2022821)

Nabil Kerdid



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Lingxiao Li, Jinliang Zhang, Mingliang Wang

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15029-15040. doi: 10.3934/math.2022823 (<https://doi.org/10.3934/math.2022823>)

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## Interval valued Hadamard-Fejér and Pachpatte Type inequalities pertaining to a new fractional integral operator with exponential kernel (/article/doi/10.3934/math.2022824)

Hari Mohan Srivastava, Soubhagya Kumar Sahoo, Pshtiwan Othman Mohammed, Bibhakar Kodamasingh, Kamsing Nonlaopon, Khadijah M. Abualnaja

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## On the sum of the largest $A_\alpha$ -eigenvalues of graphs (/article/doi/10.3934/math.2022825)

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2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15064-15074. doi: 10.3934/math.2022825 (<https://doi.org/10.3934/math.2022825>)

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2022, Volume 7 (</math/article/archives>), Issue 8 (</math/article/2022/8/archive-articles>): 15075-15093. doi: 10.3934/math.2022826 (<https://doi.org/10.3934/math.2022826>)

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## On the SEL Egyptian fraction expansion for real numbers (</article/doi/10.3934/math.2022827>)

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2022, Volume 7 (</math/article/archives>), Issue 8 (</math/article/2022/8/archive-articles>): 15094-15106. doi: 10.3934/math.2022827 (<https://doi.org/10.3934/math.2022827>)

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## Soft separation axioms via soft topological operators (</article/doi/10.3934/math.2022828>)

Tareq M. Al-shami, Zanyar A. Ameen, A. A. Azzam, Mohammed E. El-Shafei

2022, Volume 7 (</math/article/archives>), Issue 8 (</math/article/2022/8/archive-articles>): 15107-15119. doi: 10.3934/math.2022828 (<https://doi.org/10.3934/math.2022828>)

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## Existence results of sequential fractional Caputo sum-difference boundary value problem (</article/doi/10.3934/math.2022829>)

Chanisara Metpattarahiran, Thitiporn Linitda, Thanin Sitthiwirattam

2022, Volume 7 (</math/article/archives>), Issue 8 (</math/article/2022/8/archive-articles>): 15120-15137. doi: 10.3934/math.2022829 (<https://doi.org/10.3934/math.2022829>)

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## Spectral tau solution of the linearized time-fractional KdV-Type equations (/article/doi/10.3934/math.2022830)

Waleed Mohamed Abd-Elhameed, Youssri Hassan Youssri

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15138-15158. doi:  
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## Inequalities of Simpson-Mercer-type including Atangana-Baleanu fractional operators and their applications (/article/doi/10.3934/math.2022831)

Muhammad Tariq, Hijaz Ahmad, Soubhagya Kumar Sahoo, Artion Kashuri, Taher A. Nofal, Ching-Hsien Hsu  
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## Analysis of the magnetohydrodynamic flow in a porous medium (/article/doi/10.3934/math.2022832)

E. Arul Vijayalakshmi, S. S. Santra, T. Botmart, H. Alotaibi, G. B. Loganathan, M. Kannan, J. Visuvasam, V. Govindan  
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## Periodic solutions and limit cycles of mixed Lienard-type differential equations (/article/doi/10.3934/math.2022833)

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## Analysis of travelling wave solutions for Eyring-Powell fluid formulated with a degenerate diffusivity and a Darcy-Forchheimer law (/article/doi/10.3934/math.2022834)

José Luis Díaz Palencia, Saeed ur Rahman, Antonio Naranjo Redondo

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## Fejér type inequalities for harmonically convex functions (/article/doi/10.3934/math.2022835)

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2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15234-15257. doi: 10.3934/math.2022835 (<https://doi.org/10.3934/math.2022835>)

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## Stationary Kirchhoff equations and systems with reaction terms (/article/doi/10.3934/math.2022836)

Radu Precup, Andrei Stan

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## Optical solitons and single traveling wave solutions of Biswas-Arshed equation in birefringent fibers with the beta-time derivative (/article/doi/10.3934/math.2022837)

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2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15282-15297. doi: 10.3934/math.2022837 (<https://doi.org/10.3934/math.2022837>)

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## Double controlled $M$ -metric spaces and some fixed point results (/article/doi/10.3934/math.2022838)

Fahim Uddin, Faizan Adeel, Khalil Javed, Choonkil Park, Muhammad Arshad

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15298-15312. doi: 10.3934/math.2022838 (<https://doi.org/10.3934/math.2022838>)

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## Blowup for regular solutions and $C^1$ solutions of the two-phase model in $\mathbb{R}^N$ with a free boundary (/article/doi/10.3934/math.2022839)

Jingjie Wang, Xiaoyong Wen, Manwai Yuen

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15313-15330. doi: 10.3934/math.2022839 (<https://doi.org/10.3934/math.2022839>)

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## Outlier detection in gamma regression using Pearson residuals: Simulation and an application (/article/doi/10.3934/math.2022840)

Muhammad Amin, Saima Afzal, Muhammad Nauman Akram, Abdisalam Hassan Muse, Ahlam H. Tolba, Tahani A. Abushal

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15331-15347. doi: 10.3934/math.2022840 (<https://doi.org/10.3934/math.2022840>)

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Research article      Special Issue (/math/article/6040/special-articles)

## Finite element approximation of fractional hyperbolic integro-differential equation (/article/doi/10.3934/math.2022841)

Zhengang Zhao, Yunying Zheng, Xianglin Zeng

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15348-15369. doi: 10.3934/math.2022841 (<https://doi.org/10.3934/math.2022841>)

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## Stabilization of a viscoelastic wave equation with boundary damping and variable exponents: Theoretical and numerical study (/article/doi/10.3934/math.2022842)

Adel M. Al-Mahdi, Mohammad M. Al-Gharabli, Maher Nour, Mostafa Zahri

2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15370-15401. doi: 10.3934/math.2022842 (<https://doi.org/10.3934/math.2022842>)

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Research article

## Solving a Fredholm integral equation via coupled fixed point on bicomplex partial metric space (/article/doi/10.3934/math.2022843)

Gunaseelan Mani, Arul Joseph Gnanaprakasam, Khalil Javed, Muhammad Arshad, Fahd Jarad  
2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15402-15416. doi:  
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Research article      Special Issue (/math/article/6170/special-articles)

**Numerical study of non-linear waves for one-dimensional planar, cylindrical and spherical flow using B-spline finite element method**  
(/article/doi/10.3934/math.2022844)

Azhar Iqbal, Abdullah M. Alsharif, Sahar Albosaily  
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Research article

**$A_\alpha$  matrix of commuting graphs of non-abelian groups**  
(/article/doi/10.3934/math.2022845)

Bilal A. Rather, Fawad Ali, Nasim Ullah, Al-Sharef Mohammad, Anwarud Din, Sehra  
2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15436-15452. doi:  
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Research article      Special Issue (/math/article/6040/special-articles)

**A pseudo-spectral scheme for variable order fractional stochastic Volterra integro-differential equations**  
(/article/doi/10.3934/math.2022846)

Obaid Algahtani, M. A. Abdelkawy, António M. Lopes  
2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15453-15470. doi:  
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Research article

**Weakly Gorenstein comodules over triangular matrix coalgebras**  
(/article/doi/10.3934/math.2022847)

Dingguo Wang, Chenyang Liu, Xuerong Fu  
2022, Volume 7 (/math/article/archives), Issue 8 (/math/article/2022/8/archive-articles): 15471-15483. doi:  
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Research article

An existence result involving both the generalized proportional Riemann-Liouville and Hadamard fractional integral equations through generalized Darbo's fixed point theorem (</article/doi/10.3934/math.2022848>)

Rahul, Nihar Kumar Mahato, Sumati Kumari Panda, Manar A. Alqudah, Thabet Abdeljawad

2022, Volume 7 (</math/article/archives>), Issue 8 (</math/article/2022/8/archive-articles>): 15484-15496. doi: 10.3934/math.2022848 (<https://doi.org/10.3934/math.2022848>)

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Research article      Special Issue (</math/article/6170/special-articles>)

New class of convex interval-valued functions and Riemann Liouville fractional integral inequalities (</article/doi/10.3934/math.2022849>)

Muhammad Bilal Khan, Omar Mutab Alsalamy, Savin Treanță, Tareq Saeed, Kamsing Nonlaopon

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Research article      Special Issue (</math/article/6170/special-articles>)

On the solutions of certain fractional kinetic matrix equations involving Hadamard fractional integrals (</article/doi/10.3934/math.2022850>)

Mohamed Akel, Muajebah Hidan, Salah Boulaaras, Mohamed Abdalla

2022, Volume 7 (</math/article/archives>), Issue 8 (</math/article/2022/8/archive-articles>): 15520-15531. doi: 10.3934/math.2022850 (<https://doi.org/10.3934/math.2022850>)

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Research article      Special Issue (</math/article/6073/special-articles>)

Theoretical and numerical analysis of solutions of some systems of nonlinear difference equations (</article/doi/10.3934/math.2022851>)

E. M. Elsayed, Q. Din, N. A. Bukhary

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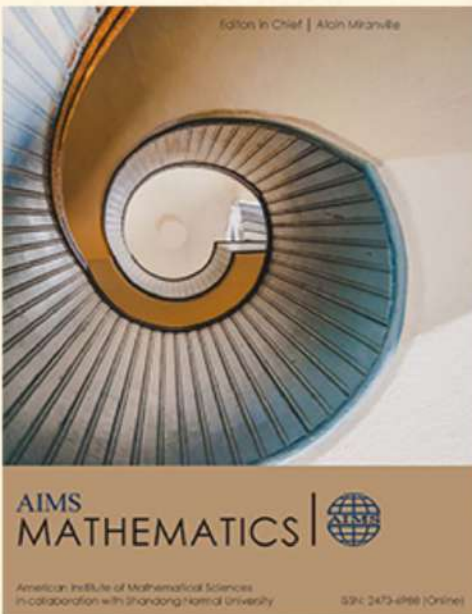
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