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3.3.2 Number of research papers per teachers in the Journals notified on UGC website during the AY 2022-2023

Details of Research Papers Per Teacher in the Journals notified on UGC

S.No	Title of the Paper	Name of the Author/s	Department of the Teacher	Name of the Journal	Year of Publication	ISSN No	Link to the Recognition In UGC enlistment of the journal / Digital Object Identifier (DOI) number
1	Performance, Combustion, and Emission Analysis of Diesel Engine Fuelled with pyrolysis oil blends with n-propyl alcohol-diesel blends-RSM Optimization and ML Modelling	Mr.K. Sunilkumar	Mechanical	Dec-2023, Cleaner Production	Dec - 2023	140354	https://www.sciencedirect.com/science/article/abs/pii/S0959652623045122
2	Performance Study on a High-Strength Extruded Magnesium Alloy Van Frame Using FEA.	Mr.K. Sunilkumar	Mechanical	Strength Of Materials , Sci, Feb 2024	Feb 2024		https://link.springer.com/article/10.1007/s11223-024-00619-7

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3	An Investigation in Temperature Data Analysis of Middle Atmospheric Variation from Saber Satellite.	Mr.K. Sunilkumar	Mechanical	Nature Of Environment Pollution Technology, Scopus, Mar 2024	March 2024	0972-6268	https://neptjournal.com/upload-images/(39)B-4064.pdf
4	Royal Poinciana Biodiesel Blends with 1-Butanol as a Potential Alternative Fuel for Unmodified Research Engines	Mr.K. Sunilkumar	Mechanical	ACS OMEGA, SCI, MAR 2024	March 2024	13960-13974	https://pubs.acs.org/doi/10.1021/acsomega.3c09014
5	The Combined Effect of Pond Ash with Borrowed Soil Materials	Mr.K. Sunilkumar	Mechanical	Ecological Engineering & Environmental Technology 2024, 25(5), 290-303	2024	2719-7050	http://www.ecoet.com/The-Combined-Effect-of-Pond-Ash-with-Borrowed-Soil-Materials-Along-with-Milling-Waste,186181,0,2.html



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6	The Effect of Emissions from DI-Based Sources Causing Hazardous Health Effects	Mr.K. Sunilkumar		Springer, May 2024 - Conference Proceedings	May 2024	1687-8140	https://link.springer.com/chapter/10.1007/978-981-97-1080-5_1#:~:text=The%20releasing%20of%20gases%20from,and%20severe%20head%20ache%20problems.
7	Emerging trends and global challenges to predict drop in thermal performance of WTG gearbox	Mr.K. Sunilkumar	Mechanical	Journal of Thermal Engineering, May 2024	May 2024	2148-7847	https://dergipark.org.tr/tr/download/article-file/3935921
8	Contributions of artificial intelligence and digitization in achieving clean and affordable energy	Mr.K. Sunilkumar	Mechanical	Intelligent Systems with Applications,	June 2024	2667-3053	https://www.sciencedirect.com/science/article/pii/S2667305324000644

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9	Mechanical And Metallurgical Properties Of Cast Az91 Magnesium Alloy	Mr.Mohan S R	Mechanical	International Journal of Novel Research and Development	Apr - 2024	2456-4184	10.6084/m9.doione.IJN RD2404040
10	Evaluation of wear behaviour of stir and squeeze cast A356/SiC/Gr hybrid composites using TOPSIS method	Mr.Mohan S R	Mechanical	International Journal of Materials Engineering Innovation	June 2023	1757-2762	https://www.researchgate.net/publication/375725559_Evaluation_of_Wear_Behaviour_of_Stir_and_Squeeze_cast_A356SiCGr_Hybrid_composites_using_TOPSIS_Method

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11	A Noval approach to IoT Based solar energy measurement and monitoring model	Dr.S.Prasath	Mechanical	European Chemical Bulletin	Aug 2023	2063-5346	https://www.studocu.com/in/document/dr-mgr-educational-and-research-institute/basic-electrical-and-electronical-engineering/a-novel-approach-to-iot-based-solar-energy-measurement-and-monitoring-model/84127014
12	Prosopis Julifera Oil : Optimization and Biodiesel Production	Dr. P. Shanmugaselvam	Mechanical	Global Gnest	Dec 2024	1790-7632	https://journal.gnest.org/publication/gnest_05916
13	Multifuntional Rescue Robot for disaster Response	Vigneshwaran V	Mechanical	International Research Journal of Modernization in Engineering Technology and Science	May 2024	2582-5208	https://www.irjmets.com/uploadedfiles/paper//issue_5_may_2024/57283/final/fir_irjmets1712458787.pdf

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14	Automated Border Surveillance system with real time threat detection	Vigneshwaran V	Mechanical	International Research Journal of Modernization in Engineering Technology and Science	May 2024	2582-5208	https://www.irjmets.com/uploadedfiles/paper//issue_5_may_2024/57283/final/fin_irjmets1716484587.pdf
15	Biofortification of iron in plants under drought stress condition	Mr.M.Suresh	Mechanical	Oxidation Communications	Aug 2023	0209-4541	https://openurl.ebsco.com/EPDB%3Agcd%3A6%3A23977462/detailv2?sid=ebsco%3Aplink%3Ascholar&id=ebsco%3Agcd%3A175507224&cr1=c&link_origin=scholar.google.co.in

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16	Study on the Phytoextraction of soil contaminated with selected Heavy metals	Mr.M.Suresh	Mechanical	Oxidation Communications	Jan 2024	0209-4541	https://openurl.ebsco.com/EPDB%3Aagcd%3A7%3A23977463/detailv2?sid=ebsco%3Aplink%3Ascholar&id=ebsco%3Aagcd%3A175507225&crl=c&link_origin=scholar.google.co.in
17	Elytrigia Repens Extracts Control Urban Mosquito Vectors with a Larvicidal Potential	Sakthivel D	Mechanical	Journal of Angiotherapy 24-04-2024	March 2024	2207-872X	https://www.publishing.emanresearch.org/Journal/FullText/5330
18	Expeimental and theoritical analysis of exhaust manifold coated and uncoated ceramics(Al_2O_3 , TiO_2 , ZrO_2)	Mr. Sunilkumar K	Mechanical	Case Studies in Thermal Engineering	Oct-23	2214-157X	https://www.sciencedirect.com/science/article/pii/S2214157X23007712?via%3Dihub
19	measurement of temperature flow analysis by condition monitoring system for WTG Gearbox to evaluate the thermal performance	Mr. Sunilkumar K	Mechanical	Journal of Thermal Engineering	Jul-23	0705-4978	https://dergipark.org.tr/en/download/article-file/3285685

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20	Identification and elimination of resonance factor for wind turbine gearbox	Mr. Sunil Kumar K	Mechanical	International Journal of Mechanical Engineering and Technology	Dec - 2023	: 0976-6359	
21	Microplastics and its Harmful effects on Humans-	Mr.M.Suresh	Mechanical	Journal of chemical and health risk	May 2024	2582-5204	https://jchr.org/index.php/JCHR/article/view/2476
22	Development of modified Homomorphic Encryption for IIoT on Textual Data	Dr Prasath S	Mechanical	IEEE explore	Mar-24		https://ieeexplore.ieee.org/document/10470692
23	Machine Learning for determining waterv quality of freshwater lakes	Mr. Tharanikumar L	Mechanical	Enviromental Quality Management	Nov 2023	6659-9987	https://onlinelibrary.wiley.com/doi/abs/10.1002/tqem.22148
24	Influence of Cerium oxide additives on pyrolysis oil blended with 1-butanol as an nanoadditive	Mr. Sunilkumar K	Mechanical	International Journal of Ambient Energy	Jan 2024	2162 - 8246	

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25	Design and Fabrication of Nickel-Chromium Reinforced 2-stage Energy Efficient Pyrolysis Reactor For Waste Plastics Applications.	Mr. Sunilkumar K	Mechanical	International Journal of Ambient Energy	Nov 2023	2162-8246	https://www.tandfonline.com/doi/full/10.1080/01430750.2023.2288148
26	Renewable Grid Monitoring and Control using Internet of Things	Mr. Tharanikumar L / Mech / Vigneshwaran V / Vinothkumar KK	Mechanical	International journal of Scientific Research in Engineering & Management	Jun-24	2658-9774	https://ijsrem.com/download/renewable-grid-monitoring-and-control-using-internet-of-things/
27	Concerning Fungal Coinfections in COVID-19: Risks, Types and Prevention - A review	Tharanikumar L / Vinothkumar KK	Mechanical	Angiotherapy	Dec 2023	2207-872X	https://publishing.emanresearch.org/Journal/Abstract/angiotherapy-829457

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28	In vitro Cytotoxicity of Activated Carbon from Musa Acuminate Fruit Peel Against HepG-2 cells	Dr Prasath S Dr Geetha & Dr. Shanmuga Sundaram M	Mechanical	Angiotherapy	Dec 2023	2207-872X	https://publishing.emanresearch.org/CurrentIssuePDF/EmanPublisher_1_5297angiotherapy-829527.pdf
29	Sustainable Fiber-Reinforced Polymer Composites: Exploring Plant-Based Fibers and Bio-Resins for Eco-Friendly Solutions	Dr. Shanmuga Sundaram M	Mechanical	Advanced sustainable systems	Sep-23	2022-0258	
30	Mechanical And Metallurgical Properties Of Cast Az91 Magnesium Alloy	Mohan S R Sakthivel D Tharanikumar L Vinothkumar KK	Mechanical	international journal of novel research and development	Apr-24	2456-4186	https://www.researchgate.net/publication/379607547_
31	An Optimization study on Wear Behaviour of AZ91/ZRB2 composites through Topsis techniques	Mohan S R	Mechanical	High-performance Sustainable Materials and Structures	Oct-24	2366-3413	https://link.springer.com/chapter/10.1007/978-3-031-72527-2_13

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32	Performance, Combustion, and Emission characteristics of palm biodeel blending CI engines	Mr.K. Sunilkumar/ Mech	Mechanical	Materials today	Oct-23	2214-7853	https://www.sciencedirect.com/science/article/abs/pii/S2214785323049805#:~:text=In%20biodiesel%20blend%20(B60)%20smoke,CO%20emission%20is%20slightly%20low.
33	Understanding and Combatting COVID-19: Insights from Clinical Characteristics and Management Strategies	Vigneshwaran V Tharanikumar L	Mechanical	Angiotherapy	February 2024	2207-872X	https://www.publishing.emanresearch.org/Journal/FullText/5262
34	Application of machine learning in optimizing thermochemical conversion processes with pre-treatment to get higher bio-oil yield from biomass waste	M. Kamarajan and K.S.Srinivasan	ECE	Indian Journal of Chemical Technology Vol. 31, January 2024, pp. 11-19 DOI: 10.56042/ijct.v31j.1.6357	Jan 2024	0975-0991	https://nopr.niscpr.res.in/handle/123456789/632

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35	Advancing Healthcare with LDCT Image Denoising through self regularization and UDA	M. Kamarajan and K.S.Srinivasan	ECE	Signal,Image and Video Processing	May 2024	1863-1711	https://link.springer.com/article/10.1007/s11760-024-03065-9
36	Computational framework for prediction of Cardiac disorders by analysing ECG signals using ML technique	Ashok kumar.M	ECE	International Journal for multi scale computational Engineering	Aug 2023	1543-1649	https://www.dl.begellhouse.com/journals/61fd1b191cf7e96f,617c618f41e0bb18,7885156049790961.html
37	Computational framework for Human detection throughimproved ultra wideband radar system	Ashok kumar.M	ECE	International Journal for multi scale computational Engineering	July 2023	1543-1649	https://www.dl.begellhouse.com/journals/61fd1b191cf7e96f,6129d44f1682fc8e,1e068d4e5c88fe0e.html
38	Analysis of Segmentation techniques for Brain MRI	Ashok kumar.M	ECE	Scopus	April 2024	2349-5138	https://www.ijrar.com/upload_issue/ijrar_issue_991.pdf

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39	Elytrigia Repens Extracts Control Urban Mosquito Vectors with a Larvicidal Potential	Dr.Manju.I	ECE	Journal of Angiotherapy 24-04-2024	March 2024	2207-872X	https://www.publishing.emanresearch.org/Journal/FullText/5330
40	IOT enabled wireless sensor networks and geospatial technology for urban infrastructure management	Dr.Manju.I	ECE	Journal of Electrical systems 01-04-2024	April 2024	1112-5209	https://journal.esrgroups.org/jes/article/view/2395
41	Opmitimizing Harmonic Mitigation forSmooth Integration of Renewable Energy Novel Approach usind Atomic Orbital search and Feedback	Dr.Manju.I	ECE	Protection andControl ofModern power Systems	July 2024	2367-0983	https://ieeexplore.ieee.org/document/10587056
42	Machine Learning for inBreast Cancer Treatment for Enhanced Outcomes with Regional Inductive Moderate Hyperthermia andNeoadjuvant Chemotherapy	Dr.Manju.I	ECE	Nanotechnology Perceptions	June 2024	2207-8843	https://nanontp.com/index.php/nano/article/view/712

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43	Navigating Covid-19 Treatment CT Scans,steroids and medical Practice challenges in INDIA	Priyadharshini.S	ECE	ANGIOTHERAPY	Feb 2024	1623-6969	https://publishing.emanresearch.org/CurrentIssuePDF/EmanPublisher_1_5265angiotherapy-829459.pdf
44	Comprehensive Review of Glaucoma detection from fundus images using deep learning	Anusuya	ECE	IEEE Xplore - Conference	Aug 2023	2473-2001	https://ieeexplore.ieee.org/abstract/document/10250604
45	Machine Learning for determining water quality of freshwater lakes	Ashok kumar.M	ECE	Enviromental Quality Management	Nov 2023	6659-9987	https://onlinelibrary.wiley.com/doi/abs/10.1002/tqem.22148
46	Unprecedented rise of mucormycosis in covid 19 patients	Ashok kumar.M	ECE	ANGIOTHERAPY	Feb-24	1623-6969	https://publishing.emanresearch.org/CurrentIssuePDF/EmanPublisher_1_5264angiotherapy-829458.pdf
47	Microplastics and its Harmful effects on Humans-	Dr. Someswaran R	CIVIL	Journal of chemical health risk	2024	6548-6985	https://jchr.org/index.php/JCHR/article/view/2476

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48	Reinforcement learning for optimizing real-time interventions and personalized feedback using wearable sensors	Vimalathithan S	CSE	Measurement: Sensors	2024	2548-9635	https://ouci.dntb.gov.ua/en/works/9JkWzq17/
49	Information Pertaining To Network Security Related Data	S.Vimalathithan M.Kanmani	CSE	JCRT	Sep 2023	2320-2882	https://www.ijert.org/papers/IJCRT2309349.pdf
50	Detect The Accuracy Of The Delay For Transportation Mode Recognition By Using Deep Learning	S.Vimalathithan M.Kanmani	CSE	JCRT	Sep 2023	2320-2883	https://www.ijert.org/papers/IJCRT2309348.pdf
51	An Android-based Image Steganography Approach to Data Communication Security using LSB and Password-based Encryption	Mr.Pandarinatha	CSE	international journal on recent and innovation trends in computer and communication	Oct 2023	2235-9987	https://ijritcc.org/index.php/ijritcc/article/view/8708
52	Analysis Of Iot And Machine Learning For Community Health Improvement Real-Time Application For Rural Development	S. Gayathri	CSE	Community practioner	June 2024	1462-2815	https://commpprac.com/june-2024/

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53	Integrating Machine Learning With Iot For Enhanced Social Services Delivery And Innovations In Community Practice	Dr.Mohideen AbdulKader M	CSE	Community practioner	June 2024	1462-2816	https://commprac.com/june-2024/
54	Intelligent Irrigation Mechanism to Enhance the Sensor Network	Dr.Paramesh J	CSE	IEEE Explore	Jul-24	2473-2001	https://ieeexplore.ieee.org/abstract/document/10690523
55	Advancing Personalized Recommendation systems with Filtering	Dr.Paramesh J	CSE	IEEE Explore	Aug-24	2473-2001	https://ieeexplore.ieee.org/document/10690603
56	A novel cloud-assisted framework for consumer internet of things based on lanner swarm optimization algorithm in smart healthcare systems	Dr.Prakash D	IT	Multimedia Tools and Applications	February 2024	1573-7721	https://doi.org/10.1007/s11042-024-18846-0
57	In vitro Ant-Cancer Activity of Methanol extracts of KIWI fruit,actindia deliciosa in HCT-1 19 cells	Dr.D.Weslin , R.Priya	IT	Journal of Angiotherapy	February 2024	2207-872X	https://publishing.emanresearch.org/Journal/Abstract/angiotherapy-829462

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58	Enhancing Parkinson's disease identification using ensemble classifier and data augmentation technique in machine learning	Dr.D.Weslin	IT	<u>Clinical eHealth</u>	Dec 2023	2523-9865	https://www.sciencedirect.com/science/article/pii/S258891412300028 X
59	Trust-based Intelligent Scheme for Mitigating Black Hole Attacks in IoT	Dr.D.Weslin	IT	Journal of Harbin Institute of Technology	2024	1005-9113	http://222.29.77.169/355100/detail/article/66fa60b1617cb9a5f0183675.html?org=355100&uorg=355100&q=AOMDV_D
60	AI based pest detection and recovery model for cyber - physical agriculture systems	Dr.Prakash D	IT	Agri 4.0 and the future of cybre - physical agriculture system	2024		https://www.sciencedirect.com/science/article/abs/pii/B9780443131851000137
61	Elytrigia Repens Extracts Control Urban Mosquito Vectors with a Larvicidal Potential	Dr.Prakash D	IT	Journal of Angiotherapy 24-04-2024	March 2024	2207-872X	https://www.publishing.emanresearch.org/Journal/FullText/5330

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62	Green Fungus Challenges in Post COVID Health Lanscape	Jeha J	EEE	Angiotherapy	Feb 2024	1127-1132	https://www.publishing.emanresearch.org/Journal/Abstract/angiotherapy-829463
63	Unprecedented Rise of Mucormycosis in Covid-19 Patients urgent need for protocol adaptation and awarness in india	Vinodh S.V	EEE	Angiotherapy	Feb 2024	1254-9856	https://publishing.emanresearch.org/CurrentIssuePDF/EmanPublisher_1_5264angiotherapy-829458.pdf
64	Renewable Grid monitoring and control using internet of things	Vinodh S.V	EEE	International Journal of Pure and Applied Mathematics		6985-9874	https://acadpubl.eu/hub/2018-119-15/1/187.pdf
65	Sustation feeder load forecasting using backe probagation network	Vinodh S.V	EEE	IRJMETS	Aug 2023	1256-9865	https://www.ijitee.org/wp-content/uploads/papers/v8i10/J10310881019.pdf

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66	Invitro cytotoxicity and apoptotic activity of aquous chloroform and methanol extracts of Kiwi fruit Actinidia deliciosa in mcf-7 cells	Kartheeswar i	EEE	Angiotherapy	Feb 2024	2207-872X	https://publishing.emanresearch.org/Journal/Abstract/angiotherapy-829460
67	Development of Fuzzy Logic Controller in Automatic Vehicle Navigation using IoT	S.Devikala	EEE	Journal of electrical systems 20.	March 2024	1112-5209	https://journal.esrgroups.org/jes/article/view/1254
68	A novel communication pathway metric evaluation using Throughput and energy Improvements over wirelee sensor networks	S.Devikala	EEE	International Journal on Recent and Innovation Trends in Compting and Communication	Aug 2023	2235-9987	https://ijritcc.org/index.php/ijritcc/article/view/8566
69	Beyond the current state of the art in Electrical vehicle Technolgy in Rrobotics and Automation	S.Devikala	EEE	Journal of electrical systems 20	March 2024	1112-5209	https://journal.esrgroups.org/jes/article/view/2398
70	Recent trends and impact of information technology in various fields	Kartheeswar i	EEE	Journal	April 2024	2584-0991	http://hbrppublication.com/OJS/index.php/RTI

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71	"Efficient and Reliable fast charging station for Electric Vehicles: Integrating PV system and Optimized control"	Mr.C.Venkatesh	EEE	Electric Power Components and Systems, Taylor & Francis	Aug 2023	1532-5008	https://www.tandfonline.com/doi/abs/10.1080/15325008.2024.2320275
72	Machine Learning for determining water quality of freshwater lakes	Mr.C.Venkatesh	EEE	Environmental Quality Management	Nov 2023	1520-6483	https://onlinelibrary.wiley.com/doi/abs/10.1002/tqem.22148
73	Anti-Cancer Activity of Allium Ascalonicum Ethanol Extract Against Human Hepatocellular Carcinoma Cell Line (HepG-2)	Mr.C.Venkatesh	EEE	Angiotherapy	Dec-23	2207-872X	https://publishing.emanresearch.org/Journal/Abstract/angiotherapy-829461
74	Understanding and Combatting COVID-19: Insights from Clinical Characteristics and Management Strategies	Dr. Balakrishnan	Chemistry	Angiotherapy	February 2024	2207-872X	https://www.publishing.emanresearch.org/Journal/FullText/5262
75	Concerning Fungal Coinfections in COVID-19: Risks, Types and Prevention - A review	Dr. Balakrishnan	Chemistry	Angiotherapy	Dec 2023	2207-872X	https://publishing.emanresearch.org/Journal/Abstract/angiotherapy-829457

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76	Structure, electronic and thermoelectric properties of novel cubic $\text{Ir}_3\text{V}(1-x)\text{Tix}$ ($x=0.125, 0.25, 0.75, 0.875$) refractory materials for high temperature applications	Dr.M.Muthu mari	Mathematics	<u>Computational Condensed Matter</u>	June 2024	2352-2143	https://www.sciencedirect.com/science/article/abs/pii/S2352214324000145
77	Neutrosophic Fuzzy Magic Labeling Graph with its Application in Academic Performance of the Students	S. Sudha	Mathematics	Neutrosophic Sets and Systems	Jan 2024	4587-9658	https://fs.unm.edu/NSS/NeutrosophicFuzzyMagic8.pdf
78	Bipolar Triangular Neutrosophic Chromatic Numbers with the Application of traffic light system	S. Sudha	Mathematics	International Journal of Neutrosophic Science	Sep 2023	6542-9658	https://americaspg.com/article/pdf/2107
79	On half range fourier cosine & sine series of octagonal fuzzy number (g mail copy)	Mrs.Rajesh wari S	Mathematics	Indian journal of Natural Sciences	Jan-4	2587-9871	https://scholar.google.com/citations?view_op=view_citation&hl=en&user=nHI-fX4AAAAJ&citation_for_view=nHI-fX4AAAAJ:2osOgNQ5qMEC

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80	green fungus challenges in post- COVID	Mrs. S. Sudha	Mathematics	Angiotherapy	Feb 2024	1127-1132	https://www.publishing.emanresearch.org/Journal/Abstract/angiotherapy-829463
81	Green Materials Towards Sustainable Development	Dr. Balakrishnan & Dr. Amudha	Chemistry	International Journal of Neutrosophic Science	Sep 2023	3579-9512	https://ijritcc.org/index.php/ijritcc/article/view/8708
82	Analysis of Pentagonal Neutrosopic Replacement Problem	Mrs. Rajeshwari S	Mathematics	Indian journal of Natural Sciences	Feb-24	2589-9632	https://scholar.google.com/citations?view_op=view_citation&hl=en&user=nHI-fX4AAAAJ&citation_for_view=nHI-fX4AAAAJ:2osOgNQ5qMEC

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A Newly proposed Fuzzy Fourier series for Reverse Order Octagonal Fuzzy number

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Abstract: Fourier series have been applied in wide areas and its application has been extended to fuzzy sets. So in this Paper we have proposed Reverse order Octagonal Fuzzy Number and its Fourier series for the period $2L$ in the interval $[-L, L]$ by using level sets. In addition, we have established Fourier series for Octagonal Fuzzy number of period $2L$ in the interval $[0, 2L]$.

Keywords: Fourier series, Fourier Coefficients, Reverse order Octagonal fuzzy number, level sets.

1. INTRODUCTION

Fourier series was introduced by Joseph Fourier (1768 - 1830), to get the solutions of heat equation. Fourier series, the most important aspect has wide applications in the real Engineering World. It has been used for data transmission and modulation. Also its application includes identifying resonant frequencies, Signal filtering, Speech recognition etc. Fourier series is widely used since the periodic signal can be expressed in terms of sine and cosine waves. With the help of Fourier analysis the complex signal can be represented as a linear combination of simple signals.

The uncertainty theory was introduced by Lotfi.Zadeh in 1965[13]. The rapid advancement of fuzzy theory enhanced the ideology of level sets of interval-valued fuzzy sets [10]. Ugur kadak, Feyzi Basar introduced Fuzzy Fourier series for periodic fuzzy valued functions [10]. In 2004, Michael Hans introduced the idea of left-right representations of a fuzzy number. T. Pathinathan and E.Anita Dolorosa introduced Fuzzy Fourier series using Hexagonal and reverse order pentagonal fuzzy number [7]. Motivated with this we have proposed reverse order OFN and its Fourier series in the interval $[-L, L]$ and the Fourier series for OFN in the interval $[0, 2L]$.

2. PRELIMINARIES

This section reviews basic definitions of fuzzy set theory, level sets, Octagonal fuzzy number.

2.1 Definition [5]: "A fuzzy set is characterized by its membership function, taking values from the domain, space or universe of discourse mapped into the unit interval $[0, 1]$. A fuzzy set A in the universal set X is defined as $A = (x, \mu(x); x \in X)$. Here



Structure, electronic and thermoelectric properties of novel cubic $\text{Ir}_3\text{V}_{(1-x)}\text{Ti}_x$ ($x = 0.125, 0.25, 0.75, 0.875$) refractory materials for high temperature applications

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ABSTRACT

The present theoretical study focuses on the impact of titanium on Ir_3V , a potential high temperature structural material that could find applications in the field of gas turbine engines and blades, aerospace industry, etc. Here we present the results of ab-initio investigations of structural, electronic and thermoelectric properties of newly designed cubic ternary intermetallic compounds namely $\text{Ir}_3\text{V}_{(1-x)}\text{Ti}_x$, where $x = 0.125, 0.25, 0.75, 0.875$. This is accomplished by using the Full-Potential Linearized Augmented Plane Wave (FP-LAPW) method within the framework of Density Functional Theory (DFT) and with the PBE-GGA exchange-correlation potential. Calculated ground-state properties such as lattice constant and other parameters for the binary compounds viz., Ir_3V and Ir_3Ti are found to be compatible with the available results. The electronic properties have been determined in terms of band structures, total and partial density of states (DOSs) and Fermi surfaces plots, which demonstrate the metallic behaviour of the compounds under study. Charge density plots revealed the presence of ionic bonding and very weak covalent bonding that depicts the ductile nature of the material. Seebeck Coefficient, electrical conductivity and power factor values of the newly designed ternary materials viz., $\text{Ir}_3\text{Ti}_{0.125}\text{V}_{0.875}$, $\text{Ir}_3\text{Ti}_{0.25}\text{V}_{0.75}$, $\text{Ir}_3\text{Ti}_{0.75}\text{V}_{0.25}$, $\text{Ir}_3\text{Ti}_{0.875}\text{V}_{0.125}$ along with binary Ir_3V and Ir_3Ti materials are computed and presented.

1. Introduction

Super alloys constituted of Iridium-based Platinum Group Metal (PGM) alloys [1] seem to attract considerable attention as they are considered to be promising materials for high-temperature structural applications such as, in gas turbine engines and blades [2–7], spark-plug tips, crucibles, tools for friction-stir welding, rocket thrust chamber, high-temperature tolerant plating & coating, etc. There are binary, ternary and quaternary alloys [8] of rhodium(Rh)/iridium(Ir) disclosed in the prior art, with the combination of and/or hafnium/zirconium/tungsten/platinum/titanium/ruthenium/palladium/niobium/tantalum/yttrium/lanthanum/rhenium/chromium/vanadium/molybdenum/and osmium. Literature survey [9–16] reveals that the iridium with group V elements is more brittle in nature than that with group IV elements of the

periodic table. Therefore, the performance of Ti in Ir_3V could be investigated theoretically to explore the possibility of improvement in ductility using the first principles study as it is done in our earlier work [17–23]. In this regard, the authors have recently reported on the mechanical properties of $\text{Ir}_3\text{V}_{1-x}\text{Ti}_x$ ($x = 0, 0.125, 0.250, 0.75, 0.875, 1$) intermetallic compounds where theoretical and experimental studies are dealt [24].

Besides, electronic structure investigations viz., Density of States, band structures, charge density plots that deals with the Fermi Energy level, $N(E_F)$, bonding nature, Fermi Surface plots that gives an idea about the physical properties of materials; investigations on transport properties such as Seebeck coefficient, electrical conductivity and power factor of $\text{Ir}_3\text{V}_{1-x}\text{Ti}_x$ ($x = 0.125, 0.250, 0.75, 0.875$) intermetallic compounds are reported here for the first time. In this direction, in the present study, the authors report the structural, electronic and

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