



# Government Degree College, Luxettipet

**District: Mancherla**

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Principal Present (FAC): Dr. Jai Kishan Ojha, M.Sc, Ph.D. Cell: 9440036165



### 3.2.1 Number of papers published per teacher in the Journals notified on UGC website during the last five years (5)

S. No.	Name of the author	Title of paper	Name of journal	Publication date	ISSN number	Link to website of the Journal	Link to article/paper/abstract of the article	Is it listed in UGC Care list/Scopus/Web of Science/other, mention
1	Dr. Jaikishan Ojha	Molecular geometry, NBO analysis, Hyperpolarizability and HOMO-LUMO energies of 2-azido-1-phenylethanone using Quantum chemical calculations	Materials today: proceedings	2016	<u>1369-7021</u>	<a href="https://www.sciencedirect.com">https://www.sciencedirect.com</a>	<a href="https://www.sciencedirect.com/science/article/pii/S2214785316303984">https://www.sciencedirect.com/science/article/pii/S2214785316303984</a>	<a href="https://www.scopus.com/sourceid/21100370037">https://www.scopus.com/sourceid/21100370037</a>
2	Dr. Jaikishan Ojha	Experimental and theoretical study of 3-methyl-4-Nitrobenzoic acid using DFT and IVP methods	Journal of Physics	2016	<u>1742-6588</u>	<a href="https://iopscience.iop.org">https://iopscience.iop.org</a>	<a href="https://iopscience.iop.org/article/10.1088/1742-6596/759/1/012057">https://iopscience.iop.org/article/10.1088/1742-6596/759/1/012057</a>	<a href="https://www.scopus.com/sourceid/130053">https://www.scopus.com/sourceid/130053</a>
3	T.Gangaiah	Magneto-hydrodynamic Flow of Nanofluid over an exponentially stretching sheet in presence of viscous dissipation and chemical reaction	Journal of Nanofluids	01-Jun-18	2169432 X	<a href="http://www.aspbs.com">http://www.aspbs.com</a> > jon	<a href="https://www.ingentaconnect.com/contentone/asp/ion/2018/00000007/00000003/art00004">https://www.ingentaconnect.com/contentone/asp/ion/2018/00000007/00000003/art00004</a>	SCOPUS <a href="http://www.aspbs.com/ion/index_abs_jon.htm">http://www.aspbs.com/ion/index_abs_jon.htm</a>
4	T.Gangaiah	The effects of thermal radiation and inclined magnetic pores on tangent hyperbolic fluidflow with zero	Journal of Nanofluids	01-Oct-18	2169432 X	<a href="http://www.aspbs.com">http://www.aspbs.com</a> > jon	<a href="https://www.ingentaconnect.com/content/asp/ion/2018/00000007/00000005/art00001;jsessionid=3mu34ovpf9oc.x-ic-live-02">https://www.ingentaconnect.com/content/asp/ion/2018/00000007/00000005/art00001;jsessionid=3mu34ovpf9oc.x-ic-live-02</a>	SCOPUS <a href="http://www.aspbs.com/ion/index_abs_jon.htm">http://www.aspbs.com/ion/index_abs_jon.htm</a>

		normal flux of Nano particles at the exponential stretching sheet						
5	T.Gangaiah	Inclined Magnetic Field and viscous Dissipation Effects on Tangent Hyperbolic Nanofluid Flow with Zero Normal Flux of Nanoparticles at the Stretching Surface	European Journal of Advances in Engineering and Technology	24-May-18	2394-658X	<a href="https://ejaet.com/">https://ejaet.com/</a>	<a href="http://www.ejaet.com/PDF/5-3/EJAET-5-3-142-150.pdf">http://www.ejaet.com/PDF/5-3/EJAET-5-3-142-150.pdf</a>	OTHER <a href="https://ejaet.com/indexing/">https://ejaet.com/indexing/</a>
6	T.Gangaiah	Thermal Radiation and Slip effects on MHD Flow and Heat Transfer of Casson Nanofluid Over an Exponentially Stretching Sheet	Journal of Nanofluids	01-Jun-18	2169432X	<a href="http://www.aspbs.com/jon">http://www.aspbs.com/jon</a>	<a href="https://www.ingentaconnect.com/content/asp/jon/2018/00000007/00000003/art00008">https://www.ingentaconnect.com/content/asp/jon/2018/00000007/00000003/art00008</a>	SCOPUS <a href="http://www.aspbs.com/jon/indexing.html">http://www.aspbs.com/jon/indexing.html</a>
7	T.Gangaiah	The influence of thermal radiation on MHD tangent hyperbolic fluid flow with zero normal flux of nano particles at the exponential stretching sheet	International Journal of Application and Applied Mathematics (AAM)	Mar-19	1932-9466	<a href="https://www.pvamu.edu/aam/">https://www.pvamu.edu/aam/</a>	<a href="https://www.pvamu.edu/aam/wp-content/uploads/sites/182/2019/03/SI0402_AAM_TG_110418_Posted_03212019.pdf">https://www.pvamu.edu/aam/wp-content/uploads/sites/182/2019/03/SI0402_AAM_TG_110418_Posted_03212019.pdf</a>	OTHER <a href="https://www.pvamu.edu/aam/indexing/">https://www.pvamu.edu/aam/indexing/</a>
8	T.Gangaiah	Radiation effect on Mhd Flow of A Tangent Hyperbolic Nanofluid over An Inclined Exponentially Stretching Sheet	International Journal of Fluid Mechanics Research	2019	2152-5110	<a href="http://www.dl.begellhouse.com/journals/71cb29ca5b40f8f8.html">http://www.dl.begellhouse.com/journals/71cb29ca5b40f8f8.html</a>	<a href="http://www.dl.begellhouse.com/journals/71cb29ca5b40f8f8,459c3ebb08635c38,35d78583238be9ee.html">http://www.dl.begellhouse.com/journals/71cb29ca5b40f8f8,459c3ebb08635c38,35d78583238be9ee.html</a>	ESCI <a href="https://www.begellhouse.com/journals/fluid-mechanics-research.html">https://www.begellhouse.com/journals/fluid-mechanics-research.html</a>
9	T.Gangaiah	The influence of thermal radiation on mixed convection MHD flow casson Nanofluid over an exponentially stretching sheet	International journal of Nano science and Nanotechnology	Jun-19	1735-7004	<a href="http://www.ijnnonline.net/">http://www.ijnnonline.net/</a>	<a href="http://www.ijnnonline.net/issue_5478_5630.html">http://www.ijnnonline.net/issue_5478_5630.html</a>	SCOPUS <a href="http://www.ijnnonline.net/journal/indexing">http://www.ijnnonline.net/journal/indexing</a>
10	T.Gangaiah	MHD Flow of Tangent Hyperbolic Nanofluid over an Inclined Sheet with Effects of Thermal Radiation and Heat Source/Sink, Special	International Journal of Application and Applied	Mar-19	1932-9466	<a href="https://www.pvamu.edu/aam/">https://www.pvamu.edu/aam/</a>	<a href="https://digitalcommons.pvamu.edu/cgi/viewcontent.cgi?article=1852&amp;context=aam">https://digitalcommons.pvamu.edu/cgi/viewcontent.cgi?article=1852&amp;context=aam</a>	OTHER <a href="https://www.pvamu.edu/aam/indexing/">https://www.pvamu.edu/aam/indexing/</a>

		Issue	Mathematics (AAM)					
11	T.Gangaiah	Impact of Thermal Radiation on MHD Flow of Tangent Hyperbolic Nanofluid Over a Nonlinear Stretching Sheet with Convective Boundary Condition	Journal of Nanofluids	01-Jan-19	2169432 X	<a href="http://www.aspbs.com">http://www.aspbs.com</a> › jon	<a href="https://www.ingentaconnect.com/content/asp/ion/2019/00000008/00000001/art00004">https://www.ingentaconnect.com/content/asp/ion/2019/00000008/00000001/art00004</a>	SCOPUS <a href="http://www.aspbs.com/ion/index_abs_jon.htm">http://www.aspbs.com/ion/index_abs_jon.htm</a>
12	T. Manjula	Green Synthesis of Dihydro Pyrimidones	International Journal of Chemtech Research	2019	0974-4290	<a href="http://www.sphinxnsai.com">www.sphinxnsai.com</a>	<a href="http://sphinxnsai.com/2019/ch_vol12_no6/2/(134-138)V12N6CT.pdf">http://sphinxnsai.com/2019/ch_vol12_no6/2/(134-138)V12N6CT.pdf</a>	OTHER <a href="https://www.sphinxnsai.com/pdf/abstractingchemtech.pdf">https://www.sphinxnsai.com/pdf/abstractingchemtech.pdf</a>
13	Dr. Jaikishan Ojha	E-Content development and OERS in Higher Education	International journal of Research and analytical reviews	Mar-20	E-ISSN 2348-1269, P-ISSN 2349-5138	<a href="http://www.ijrar.org">www.ijrar.org</a>	<a href="https://www.ijrar.org/papers/IJRAR1AZP018.pdf">https://www.ijrar.org/papers/IJRAR1AZP018.pdf</a>	UGC Approved <a href="https://ijrar.org/">https://ijrar.org/</a>
14	Pulluru Savitha	E-Content development and OERS in Higher Education	International journal of Research and analytical reviews	Mar-20	E-ISSN 2348-1269, P-ISSN 2349-5138	<a href="http://www.ijrar.org">www.ijrar.org</a>	<a href="https://www.ijrar.org/papers/IJRAR1AZP018.pdf">https://www.ijrar.org/papers/IJRAR1AZP018.pdf</a>	UGC Approved <a href="https://ijrar.org/">https://ijrar.org/</a>
15	P.Chandrashekar	Study of Phytoplankton of Mothe River, Jagtial District, Telangana	International Journal of Life Sciences	2020	Online ISSN: 2320-964X   Print ISSN: 2320-7817	<a href="http://www.ijlsci.in">www.ijlsci.in</a>	<a href="https://ijlsci.in/ls/index.php/home/article/view/120">https://ijlsci.in/ls/index.php/home/article/view/120</a>	OTHER <a href="https://ijlsci.in/ls/index.php/home/indexing">https://ijlsci.in/ls/index.php/home/indexing</a>
16	P.Chandrashekar	Zooplankton based Trophic assessment of mathadi vagu dam district Adilabad Telangana state	International Journal of Life Sciences	2020	Online ISSN: 2320-964X   Print ISSN:	<a href="http://www.ijlsci.in">www.ijlsci.in</a>	<a href="https://ijlsci.in/ls/index.php/home/article/view/168">https://ijlsci.in/ls/index.php/home/article/view/168</a>	OTHER <a href="https://ijlsci.in/ls/index.php/home/indexing">https://ijlsci.in/ls/index.php/home/indexing</a>

					2320-7817			
17	<b>P.Chandra shekar</b>	Fisheries management and fishing techniques used in nizam sagar dam district kamareddy Telangana state India	<b>International Journal of Life Sciences</b>	2020	Online ISSN: 2320-964X   Print ISSN: 2320-7817	<a href="http://www.ijlsci.in">www.ijlsci.in</a>	<a href="https://ijlsci.in/ls/index.php/home/article/view/168">https://ijlsci.in/ls/index.php/home/article/view/168</a>	OTHER <a href="https://ijlsci.in/ls/index.php/home/indexing">https://ijlsci.in/ls/index.php/home/indexing</a>
18	<b>Dr. E. Rajakumar</b>	Samkaaleen Adivasi Kavitha		2017	-	-		



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1	Dr. Jalkishan Ojha	Molecular geometry, NBO analysis, Hyperpolarizability and HOMO-LUMO energies of 2-azido-1-phenylethanone using Quantum chemical calculations	Materials today: proceedings	2016	1369-7021	<a href="https://www.sciencedirect.com">https://www.sciencedirect.com</a>	<a href="https://www.sciencedirect.com/science/article/pii/S2214785316303984">https://www.sciencedirect.com/science/article/pii/S2214785316303984</a>	<a href="https://www.scopus.com/sourceid/21100370037">https://www.scopus.com/sourceid/21100370037</a>
2	Dr. Jalkishan Ojha	Experimental and theoretical study of 3-methyl-4-Nitrobenzoic acid using DFT and IVP methods	Journal of Physics	2016	1742-6588	<a href="https://iopscience.iop.org">https://iopscience.iop.org</a>	<a href="https://iopscience.iop.org/article/10.1088/1742-6596/759/1/012057">https://iopscience.iop.org/article/10.1088/1742-6596/759/1/012057</a>	<a href="https://www.scopus.com/sourceid/130053">https://www.scopus.com/sourceid/130053</a>
3	T.Gangaiah	Magnetohydrodynamic Flow of Nanofluid over an exponentially stretching sheet in presence of viscous dissipation and chemical reaction	Journal of Nanofluids	01-Jun-18	2169432 X	<a href="http://www.aspbs.com/jon">http://www.aspbs.com/jon</a>	<a href="https://www.ingentaconnect.com/contentone/asp/ion/2018/00000007/00000003/art00004">https://www.ingentaconnect.com/contentone/asp/ion/2018/00000007/00000003/art00004</a>	SCOPUS <a href="http://www.aspbs.com/ion/ind-abs/ion.htm">http://www.aspbs.com/ion/ind-abs/ion.htm</a>
4	T.Gangaiah	The effects of thermal radiation and inclined magnetic pores on tangent hyperbolic fluidflow with zero	Journal of Nanofluids	01-Oct-18	2169432 X	<a href="http://www.aspbs.com/jon">http://www.aspbs.com/jon</a>	<a href="https://www.ingentaconnect.com/content/asp/ion/2018/00000007/00000005/art00001,jsessionid=3mu34ovpf9oc.x-ic-live-02">https://www.ingentaconnect.com/content/asp/ion/2018/00000007/00000005/art00001,jsessionid=3mu34ovpf9oc.x-ic-live-02</a>	SCOPUS <a href="http://www.aspbs.com/ion/ind-abs/ion.htm">http://www.aspbs.com/ion/ind-abs/ion.htm</a>

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
		normal flux of Nano particles at the exponential stretching sheet							
5	T. Gangaiah	Inclined Magnetic Field and viscous Dissipation Effects on Tangent Hyperbolic Nanofluid Flow with Zero Normal Flux of Nanoparticles at the Stretching Surface	European Journal of Advances in Engineering and Technology	24-May-18	2394-658X	<a href="https://ejaet.com/">https://ejaet.com/</a>	<a href="http://www.ejaet.com/PDF/5-3/EJAET-5-3-142-150.pdf">http://www.ejaet.com/PDF/5-3/EJAET-5-3-142-150.pdf</a>	OTHER <a href="https://ejaet.com/indexing/">https://ejaet.com/indexing/</a>	
6	T. Gangaiah	Thermal Radiation and Slip effects on MHD Flow and Heat Transfer of Casson Nanofluid Over an Exponentially Stretching Sheet	Journal of Nanofluids	01-Jun-18	2169432X	<a href="http://www.aspbs.com/jon">http://www.aspbs.com/jon</a>	<a href="https://www.ingentaconnect.com/content/asp/ion/2018/0000007/0000003/art00008">https://www.ingentaconnect.com/content/asp/ion/2018/0000007/0000003/art00008</a>	SCOPUS <a href="http://www.aspbs.com/ion/indexing/ion.htm">http://www.aspbs.com/ion/indexing/ion.htm</a>	
7	T. Gangaiah	The influence of thermal radiation on MHD tangent hyperbolic fluid flow with zero normal flux of nano particles at the exponential stretching sheet	International Journal of Application and Applied Mathematics (AAM)	Mar-19	1932-9466	<a href="https://www.pvamu.edu/aam/">https://www.pvamu.edu/aam/</a>	<a href="https://www.pvamu.edu/aam/wp-content/uploads/sites/182/2019/03/SI0402_AAM_TG_110418_Posted_03212019.pdf">https://www.pvamu.edu/aam/wp-content/uploads/sites/182/2019/03/SI0402_AAM_TG_110418_Posted_03212019.pdf</a>	OTHER <a href="https://www.pvamu.edu/aam/indexing/">https://www.pvamu.edu/aam/indexing/</a>	
8	T. Gangaiah	Radiation effect on Mhd Flow of A Tangent Hyperbolic Nanofluid over An Inclined Exponentially Stretching Sheet	International Journal of Fluid Mechanics Research	2019	2152-5110	<a href="http://www.dl.begellhouse.com/journals/71cb29ca5b40f8f8.html">http://www.dl.begellhouse.com/journals/71cb29ca5b40f8f8.html</a>	<a href="http://www.dl.begellhouse.com/journals/71cb29ca5b40f8f8,459c3ebb08635c38,35d78583238be9ee.html">http://www.dl.begellhouse.com/journals/71cb29ca5b40f8f8,459c3ebb08635c38,35d78583238be9ee.html</a>	ESCI <a href="https://www.begellhouse.com/journals/fluid-mechanics-research.html">https://www.begellhouse.com/journals/fluid-mechanics-research.html</a>	
9	T. Gangaiah	The influence of thermal radiation on mixed convection MHD flow casson Nanofluid over an exponentially stretching sheet	International Journal of Nano science and Nano technology	Jun-19	1735-7004	<a href="http://www.iinonline.net/">http://www.iinonline.net/</a>	<a href="http://www.iinonline.net/issue_5478_5630.html">http://www.iinonline.net/issue_5478_5630.html</a>	SCOPUS <a href="http://www.iinonline.net/journal/indexing">http://www.iinonline.net/journal/indexing</a>	
10	T. Gangaiah	MHD Flow of Tangent Hyperbolic Nanofluid over an Inclined Sheet with Effects of Thermal Radiation and Heat Source/Sink, Special	International Journal of Application and Applied	Mar-19	1932-9466	<a href="https://www.pvamu.edu/aam/">https://www.pvamu.edu/aam/</a>	<a href="https://digitalcommons.pvamu.edu/cgi/viewcontent.cgi?article=1852&amp;context=aam">https://digitalcommons.pvamu.edu/cgi/viewcontent.cgi?article=1852&amp;context=aam</a>	OTHER <a href="https://www.pvamu.edu/aam/indexing/">https://www.pvamu.edu/aam/indexing/</a>	

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12	T. Manjula	Green Synthesis of Dihydro Pyrimidones	International Journal of Chemtech Research	2019	0974-4290	<a href="http://www.sphinxσαι.com">www.sphinxσαι.com</a>	<a href="http://sphinxσαι.com/2019/ch_vol12_no6/2/(134-138)V12N6CT.pdf">http://sphinxσαι.com/2019/ch_vol12_no6/2/(134-138)V12N6CT.pdf</a>	OTHER <a href="https://www.sphinxσαι.com/pdf/abstractinghemtech.pdf">https://www.sphinxσαι.com/pdf/abstractinghemtech.pdf</a>
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14	Pulluru Savitha	E-Content development and OERS in Higher Education	International Journal of Research and analytical reviews	Mar-20	E-ISSN 2348-1269, P-ISSN 2349-5138	<a href="http://www.ijrar.org">www.ijrar.org</a>	<a href="https://www.ijrar.org/papers/IJRAR1AZP018.pdf">https://www.ijrar.org/papers/IJRAR1AZP018.pdf</a>	UGC Approved <a href="https://ijrar.org/">https://ijrar.org/</a>
15	P. Chandrashekar	Study of Phytoplankton of Mothe River, Jagtial District, Telangana	International Journal of Life Sciences	2020	Online ISSN: 2320-964X   Print ISSN: 2320-7817	<a href="http://www.ijlsci.in">www.ijlsci.in</a>	<a href="https://ijlsci.in/ls/index.php/home/article/view/120">https://ijlsci.in/ls/index.php/home/article/view/120</a>	OTHER <a href="https://ijlsci.in/ls/index.php/home/indexing">https://ijlsci.in/ls/index.php/home/indexing</a>
16	P. Chandrashekar	Zooplankton based Trophic assessment of mathadi vagu dam district Adilabad Telangana state	International Journal of Life Sciences	2020	Online ISSN: 2320-964X   Print ISSN: 2320-7817	<a href="http://www.ijlsci.in">www.ijlsci.in</a>	<a href="https://ijlsci.in/ls/index.php/home/article/view/168">https://ijlsci.in/ls/index.php/home/article/view/168</a>	OTHER <a href="https://ijlsci.in/ls/index.php/home/indexing">https://ijlsci.in/ls/index.php/home/indexing</a>

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					2320-7817		
17	P.Chandra shekar	Fisheries management and fishing techniques used in nizam sagar dam district kamareddy Telangana state India	International Journal of Life Sciences	2020	Online ISSN: 2320-964X   Print ISSN: 2320-7817	<a href="http://www.ijlsci.in">www.ijlsci.in</a>	OTHER <a href="https://ijlsci.in/ls/index.php/home/indexing">https://ijlsci.in/ls/index.php/home/indexing</a>
18	Dr. E. Rajakumar	Samkaaleen Adivasi Kavitha		2017			

  
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## ABSTRACTING AND INDEXING

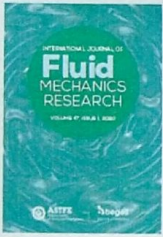
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# International Journal of Fluid Mechanics Research

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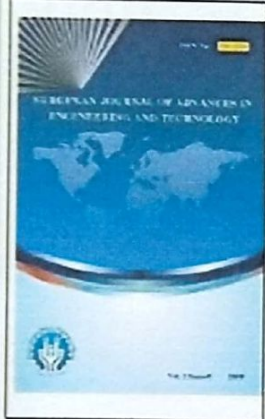




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## RADIATION EFFECT ON MHD FLOW OF A TANGENT HYPERBOLIC NANOFUID OVER AN INCLINED EXPONENTIALLY STRETCHING SHEET

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**ABSTRACT**

The influence of thermal radiation on MHD boundary layer flow of a tangent hyperbolic nanofluid with zero normal flux of nanoparticles over an inclined exponentially stretching sheet in the presence of suction/blowing is studied. The partial differential systems are transformed to ordinary differential systems by using appropriate similarity transformations. The transformed systems are solved numerically by the Runge-Kutta fourth-order method with shooting technique. The velocity, temperature, and nanoparticle volume fraction profiles are discussed for different physical parameters. As the skin friction and Nusselt number are exhibited and analyzed as well. It is found that the thermal radiation enhances the effective thermal diffusivity and the temperature rises. It is also observed that the buoyancy parameter strengthens the

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## Molecular geometry, NBO analysis, Hyperpolarizability and HOMO-LUMO energies of 2-azido-1-phenylethanone using Quantum chemical calculations

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### Abstract

The Fourier Transform Infrared (FTIR) spectrum of 2-azido-1-phenylethanone (APE) has been recorded in the range 4000–400  $\text{cm}^{-1}$  respectively. The optimized geometry of the molecule has been computed by evaluating the torsional potential energy as a function of angle of rotation about the interlinking bonds of APE using quantum chemical calculations. These calculations were carried out using density functional theory (DFT) employing B3LYP functional with 6-311++G(d,p) basis set. Stability of the molecule arising from hyper conjugative interactions, charge delocalization has been analyzed using natural bond orbital (NBO) analysis. The values of dipole moment, polarizability and hyperpolarizability were computed to determine the NLO behaviour of the molecule under study. The HOMO and LUMO energies were also evaluated for this molecule to demonstrate the chemical stability.

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*Keywords:* 2-Azido-1-phenylethanone; FTIR spectrum; DFT; Molecular geometry; Hyperpolarizability; NBO analysis; HOMO-LUMO

### 1. Introduction

Azide is the anion with the formula  $\text{N}_3^-$  which is a conjugate base of hydrazoic acid ( $\text{HN}_3$ ) and is isoelectronic with  $\text{CO}_2$  and  $\text{N}_2\text{O}$ . It is also a functional group in organic chemistry,  $\text{RN}_3$  [1]. Organic azides represent a unique substance class, which is able to undergo a multitude of reactions used for a variety of applications in industry [2]. They are versatile starting materials for the synthesis of a variety of nitrogen-containing compounds that attracts

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## Experimental and theoretical study of 3-methyl-4-nitrobenzoic acid using DFT and IVP methods

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**Abstract.** The Fourier Transform Infrared (FTIR) and FT-Raman spectra of 3-methyl-4-nitrobenzoic acid have been recorded in the range 4000-400  $\text{cm}^{-1}$  and 3500-50  $\text{cm}^{-1}$ , respectively. The optimized geometry of the molecule, its vibrational frequencies have been computed using the Density Functional Theory (DFT) employing B3LYP/6-311++G basis set. The scaled values of harmonic vibrational frequencies so obtained have been compared with their experimental counter parts. The scaling factors have been refined to reproduce the frequencies with an RMS error of 9.26  $\text{cm}^{-1}$  between the experimental and computed frequencies. The theoretically predicted FTIR and FT-Raman spectra agree satisfactorily with those of experimental spectra. A 89-parameter modified valence force field was evaluated by solving inverse vibrational problem (IVP) using Wilson's GF matrix method. The force constants were refined using 44 experimental frequencies of this molecule in overlay least-squares technique. The average error between observed and computed frequencies was found 11.61  $\text{cm}^{-1}$ . PED and eigen vectors computed in the process were used to make unambiguous vibrational assignments of all the fundamental vibrations of this molecule. The values of dipole moment and hyperpolarizability were determined to study the NLO behaviour of this molecule. The HOMO and LUMO energies were also evaluated for this molecule.

### 1. Introduction

Vibrational assignment for complex systems can be proposed based on frequency agreement between the computed and observed fundamental frequencies. The spectroscopists have been investigating to develop 'a priori' method of predicting vibrational frequencies of a given molecule for the past two and a half decades. In this process, two different and distinct methods, namely classical experimental approach [1] and theoretical quantum mechanics approach [2-13], have been evolved.

In experimental approach, Snyder and Schachtschneider [1] proposed the overlay least-square technique wherein a set of related molecules can be treated together to reduce the number of force constants. This method has been applied successfully to some representative molecular systems as reported in our earlier work on nitrotoluenes, dimethylanilines and some substituted methylbenzenes [14]; and on other molecules as mentioned therein.

Spectroscopic investigation has been carried out in theoretical approach in our earlier work on 3,6-dichloro-4-methylpyridazine and 3,6-dichloropyridazine-4-carboxylic acid by DFT method using B3LYP functional with 6-311++G(d,p) basis set [15]; and 4-methyl-3-nitrobenzoic acid employing DFT method employing B3LYP/6-311++G level of theory [16]. We have recently reported the results

# E-Content Development and OERs in Higher Education: Issues & Challenges

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## Abstract

As goes the Sanskrit saying "Vidhwan Sarvatra Pujyate", a scholar is respected globally irrespective of his status, society, culture, and nation. Education is one that vital tool which makes mankind wise, peaceful and happy. The world is witnessing a high pace technological revolution in almost all aspects of human life and access to world-class knowledge through open learning resources like MOOCs, UDACITY, COURSERA, EDX, SHAKSHAT, NMEICT, NPTEL, SWAYAM, has become a cakewalk today. This development has more significance in the Indian context which is blessed with a demographic dividend. But these courses require self-regulated discipline and candidness.

The major challenge being poor connectivity, availability of infrastructure, potential teachers, quality students, genuine critiques and the linguistic constraint, the fruition of many piloted projects is not as expected. The efficacy of the micro-credentials granted by these virtual classrooms also needs to be peer-reviewed. The present paper shall try to enlighten on issues and challenges involved in e-learning.

## Introduction

Mankind always exhibited a quest for superior quality knowledge that set him up on the path of innovation and technological growth and is making things happen that might have been felt impossible just a decade back. The access to renowned institutions that imparted domestic knowledge of high competence was always confined to a section of students with a high profile who can afford expensive learning

The credit for massive availability of Open Educational Resources goes to the most renowned and sought after institution, the Massachusetts Institute of Technology that launched the prestigious project MITOPENCOURSEWARE in 2002 which triggered the global open educational resources movement. The term Open Educational Resources was first adopted at UNESCO's 2002 forum on Impact of Open Course Ware in Higher Education for developing countries.

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# The Effects of Thermal Radiation and Inclined Magnetic Force on Tangent Hyperbolic Fluid Flow with Zero Normal Flux of Nanoparticles at the Exponential Stretching Sheet

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In this article, we have presented the two-dimensional tangent hyperbolic fluid with zero normal flux of nanoparticles over an exponentially stretching sheet in presence of thermal radiation along with inclined magnetic field and radiative heat flux. The governing non-linear system of partial differential equations along with boundary conditions for this fluid flow is reduced to a system of non-linear ordinary differential equations by using appropriate similarity transformations. The reduced system is numerically solved by Runge-Kutta fourth order method with shooting technique. The influence of emerging non-dimensional parameters on velocity, temperature and nanoparticle volume fraction profiles have been discussed and presented graphically. Furthermore, the effects of these parameters on skin friction coefficient and local Nusselt number at the sheet are exhibited and discussed. It is noticed that the thermal boundary layer thickness enhanced with the increase in Weissenberg number ( $We$ ), the angle of inclination ( $\delta$ ), power-law index ( $n$ ) and heat source/sink parameter ( $Q_r$ ). Whereas, the velocity profiles and the skin friction coefficient decreases with an increase in Weissenberg number and power-law index.

**KEYWORDS:** Tangent Hyperbolic Fluid, Zero Normal Flux, Exponentially Stretching, Thermal Radiation, Weissenberg Number, Power-Law Index.

## 1. INTRODUCTION

In past few decades, the study of laminar boundary layer flow over a stretching sheet has lot of importance due to its numerous applications in industrial manufacturing processes such as wire drawing, hot rolling, manufacturing of plastic and rubber surfaces, condensation process of metallic plate in a cooling bath and glass, fiber spinning and many others. In all these cases, during such processes both stretching and simultaneous cooling or heating have a decisive influence on the quality of the final products. Sakiadis<sup>1</sup> probably was first who studied the problem of boundary layer flow over a continuous solid surface moving with constant velocity. Crane<sup>2</sup> extended this concept to the viscous fluid flow over a linearly stretching sheet and obtained a similar solution for the steady two-dimensional problem. Wang<sup>3</sup> discussed the unsteady laminar flow of

viscous fluid and computed similarity solutions. Magyari and Keller<sup>4</sup> then investigated the steady boundary layer flow on a continuous stretching surface with exponential temperature distribution while Partha et al.<sup>6</sup> analyzed the effects of viscous dissipation on the mixed convection heat transfer from an exponentially stretching surface. Cortell<sup>5</sup> discussed the flow of non-Newtonian fluid over stretching surface and found a numerical solution through shooting method. Sajid and Hayat<sup>7</sup> extended the works of Partha et al.<sup>6</sup> to include radiation effects on the flow over an exponentially stretching sheet and solved the problem analytically using the homotopy analysis method. A plenty of literature has been produced by researchers on boundary layer flows over stretching sheet.<sup>8–14</sup>

The study of the magnetohydrodynamic (MHD) flow of an electrically conducting fluid is of considerable interest in modern metallurgical and metal-working processes. The process of fusing of metals, power generation systems and cooling of nuclear reactor are good examples of such fields. In biomedical field, MHD flow has many practical applications such as magnetic field effects on

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# Magnetohydrodynamic Flow of Nanofluid Over an Exponentially Stretching Sheet in Presence of Viscous Dissipation and Chemical Reaction

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This frame work is devoted to studying the effects of viscous dissipation and chemical reaction on MHD flow of non-Newtonian nanofluid over an exponentially stretching surface with suction/injection. The system of partial differential equations is reduced to a system of non-linear ordinary differential equations by using suitable similarity transformations and solved numerically by Keller-Box Method. In the present study, the effects of the physical parameters on velocity, temperature and concentration profiles have been discussed and presented graphically. Also, the skin friction coefficient, local Nusselt and local Sherwood numbers at the sheet are exhibited and discussed. It is found that the thermal boundary layer thickness increases with increase in the viscous dissipation parameter. Finally, the concentration boundary layer thickness decreases with an increase in chemical reaction parameter.

**KEYWORDS:** MHD, Exponentially Stretching, Nanofluid, Viscous Dissipation, Chemical Reaction.

## 1. INTRODUCTION

The study of laminar boundary layer flow over a stretching sheet has received much interest in recent years due to its numerous applications in industrial manufacturing processes such as wire drawing, hot rolling, manufacturing of plastic and rubber surfaces, condensation process of metallic plate in a cooling bath and glass, fiber spinning and many others. In all these cases, during such processes both stretching and simultaneous cooling or heating have a decisive influence on the quality of the final products. Sakiadis<sup>1</sup> probably was first who studied the problem of boundary layer flow over a continuous solid surface moving with constant velocity. Crane<sup>2</sup> extended this concept to the flow over a linearly stretching sheet and obtained a similar solution in closed analytical form for the steady two-dimensional problem. Carragher and Crane<sup>3</sup> discussed the effects of heat transfer on a continuous stretching sheet. Ali<sup>4</sup> investigated the similarity solutions of laminar boundary-layer equations in a quiescent fluid driven by a stretched sheet subject to fluid suction or injection. On the other hand, Gupta and Gupta<sup>5</sup> stressed that, stretching of fluid surface is not necessarily linear. Magyari and

Keller<sup>6</sup> then investigated the steady boundary layer flow on a stretching continuous surface with exponential temperature distribution while Partha et al.<sup>7</sup> analyzed the effects of viscous dissipation on the mixed convection heat transfer from an exponentially stretching surface. Sajid and Hayat<sup>8</sup> extended the works of Partha et al.<sup>7</sup> to include radiation effects on the flow over exponential stretching sheet and solved the problem analytically using the homotopy analysis method. The numerical solution for the same problem was then presented by Bidin and Nazar.<sup>9</sup> Elbashedy,<sup>10</sup> Mahapatra and Gupta,<sup>11</sup> Pop et al.,<sup>12</sup> Ishak et al.<sup>13</sup> and Malga and Kishan<sup>14</sup> studied the boundary layer flow problems over stretching sheet taking into various aspects of the problem.

The study of the magnetohydrodynamic (MHD) flow of an electrically conducting fluid is of considerable interest in modern metallurgical and metal-working processes. The process of fusing of metals in an electrical furnace by applying a magnetic field and the process of cooling of the wall inside a nuclear reactor containment vessel are good examples of such fields. Some important applications of radiative heat transfer include MHD accelerators, high temperature plasmas, power generation systems and cooling of nuclear reactors. Many processes in engineering areas occur at high temperatures and knowledge of radiation heat transfer becomes very important for the

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# The Influence of Thermal Radiation on Mixed Convection MHD Flow of a Casson Nanofluid over an Exponentially Stretching Sheet

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## Abstract

The present article describes the effects of thermal radiation and heat source/sink parameters on the mixed convective magnetohydrodynamic flow of a Casson nanofluid with zero normal flux of nanoparticles over an exponentially stretching sheet along with convective boundary condition. The governing nonlinear system of partial differential equations along with boundary conditions for this fluid flow converted to a system of nonlinear ordinary differential equations by using appropriate similarity transformations. The converted system of equations were solved numerically by using Runge-Kutta fourth order method with shooting technique. The influence of various non-dimensional governing parameters on velocity, temperature and nanoparticle volume fraction profiles have been discussed and presented graphically. Furthermore, the impacts of these parameters on skin friction coefficient and local Nusselt number are exhibited graphically and analyzed. It found that the velocity profiles and skin friction coefficient increases with an increase in the mixed convection parameter whereas, an opposite trend observed with Casson fluid parameter and magnetic field parameter. The thermal boundary layer thickness enhanced with an increase in Biot number, magnetic field parameter, radiation parameter and heat source/sink parameter. Also, the local Nusselt number decreases with an increase in radiation parameter and heat source/sink parameter.

**Keywords:** Thermal radiation, Heat source/sink, Mixed convection, Casson nanofluid, Exponential stretching.

## 1. INTRODUCTION

The study of heat and mass transfer of the laminar boundary layer flow over a stretching sheet has expeditious development due to its numerous applications in different engineering and industrial manufacturing processes like aerodynamics, wire drawing, hot rolling, extrusion of plastic and rubber sheets, glass blowing, condensation process of metallic plates, fiber spinning and many others. During such processes, both stretching and simultaneous cooling or heating have a decisive influence on the quality of the final products. The study of boundary layer flow over a continuous stretching surface with constant velocity was initiated by Sakiadis [1]. Later, Crane

[2] extended this concept to study two-dimensional viscous fluid flow in which velocity varies over a linearly stretching sheet and obtained a similar solution. Wang [3] enlarged this concept for three-dimensional flow and found exact similarity solution for the Navier-Stokes equations. The influence of suction/blowing on heat and mass transfer over a stretching sheet was studied by Gupta and Gupta [4]. The problems of Sakiadis and Crane were extended by many researchers like Carragher and Crane [5], Bidin and Nazar [6], Bhattacharyya et al. [7] and Sandeep and Sugunamma [8] under various stretching sheets and boundary conditions.



## The Influence of Thermal Radiation on MHD Tangent Hyperbolic Fluid Flow with Zero Normal Flux of Nanoparticles over an Exponential Stretching Sheet

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### Abstract

This article presents the two-dimensional MHD flow of tangent hyperbolic fluid with zero normal flux of nano-particles over an exponentially stretching sheet in presence of thermal radiation. The governing system of non-linear partial differential equations along with boundary conditions for this fluid flow is converted into a system of non-linear ordinary differential equations by using appropriate similarity transformations. The reduced system is numerically solved by Runge-Kutta fourth order method with shooting technique. The effects of emerging non-dimensional parameters on velocity, temperature and nanoparticle volume fraction profiles have been discussed and presented graphically. Furthermore, the impacts of these parameters on skin friction coefficient and local Nusselt number at the sheet are exhibited and discussed. Noticed that the thermal boundary layer thickness enhanced with the increase in Weissenberg number, power-law index and radiation parameter whereas the velocity profiles and the skin friction coefficient decreases with an increase in Weissenberg number and power-law index.

**Keywords:** Thermal radiation; tangent hyperbolic; zero normal flux; exponentially stretching; Weissenberg number

**MSC 2010 No.:** 80A20, 76A02, 76W05, 74A15

# Thermal Radiation and Slip Effects on MHD Flow and Heat Transfer of Casson Nanofluid Over an Exponentially Stretching Sheet

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In the present study, the effects of velocity slip and thermal slip on MHD boundary layer flow of Casson Nanofluid over an exponentially stretching sheet in presence of thermal radiation and suction/blowing is investigated numerically. By means of proper similarity transformations, the governing partial differential equations are transformed to set of non-linear ordinary differential equations which are solved by Runge-Kutta fourth order method with shooting technique. The similarity solutions for velocity, temperature and nanoparticle volume fraction profiles for different values of the physical parameters are discussed and presented graphically. As well as the Skin-friction coefficient, local Nusselt and local Sherwood numbers are exhibited and analyzed. It is found that the thermal radiation enhances the effective thermal diffusivity and the temperature rises. Velocity and temperature profiles are found to decrease with an increase of velocity slip and thermal slip parameters respectively. Finally, the velocity decreases with the increasing values of Casson parameter.

**KEYWORDS:** MHD, Exponentially Stretching, Radiation, Suction/Blowing, Similarity Solutions.

## 1. INTRODUCTION

A nanofluid is a liquid containing nanometer-sized solid particles, called nanoparticles, which basically increasing thermal conductivity of the base fluids according to an investigation of Choi.<sup>1</sup> Nanofluids are basically distinguished by the fact that Brownian agitation overcomes any settling motion due to gravity. Thus, a stable nanofluid is theoretically possible as long as particles stay small enough (generally smaller than 100 nm). The used nanoparticles may be of oxides, such as (AlO<sub>3</sub>), carbides (SiC), nitrides (AlN, SiN), metals (Al, Cu) or non-metals (graphite, carbon nanotubes). Therefore, nanofluids as superior solid-liquid phase materials are utilized in thermal energy storage and heat exchangers, which expand the nanofluid advantages. The innovative and potential usage of nanofluids requires thermal conductivity measurements and modeling for nanofluids of various nanomaterials and updatable base liquids. Pak and Cho<sup>2</sup> ascribed the increased heat transfer coefficients noticed in nanofluids to the dispersion of suspended particles. Xuan and Li<sup>3</sup> proposed that the heat transfer enhancement was the result of

the increase in turbulence induced by nanoparticle motion. A large amount of literature is available, which deals with studying nanofluids and their applications.<sup>4–6</sup>

The momentum and heat transfer of the boundary layer flow over a stretching surface have been applied in numerous chemical engineering processes, such as polymer extrusion processes and metallurgical processes, which involve cooling of a molten liquid. Sakiadis<sup>7</sup> initiated studying the boundary layer flow over a stretched surface moving with a constant velocity and formulated boundary layer equations for two dimensional and axisymmetric flows. Crane<sup>8</sup> investigated the flow caused by a stretching sheet. On the other hand, Gupta<sup>9</sup> stressed that realistically, stretching surface is not necessarily continuous. Magyari and Keller<sup>10</sup> analyzed the steady boundary layers on an exponentially stretching continuous surface with an exponential temperature distribution. Elbashbeshy<sup>11</sup> investigated the heat transfer over an exponentially stretching continuous surface with suction. Several authors have considered various aspects of this problem and obtained similarity solutions.<sup>12–18</sup> Later, Rudraswamy and Gireesha<sup>19</sup> studied the effects of thermal radiation and chemical reaction on MHD flow and heat transfer of a nanofluid over an exponentially stretching sheet.

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# Impact of Thermal Radiation on MHD Flow of Tangent Hyperbolic Nanofluid Over a Nonlinear Stretching Sheet with Convective Boundary Condition

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The present study explores the effect of thermal radiation on MHD boundary layer flow of tangent hyperbolic Nanofluid with zero normal flux of nanoparticles over a non-linear stretching sheet. The partial differential systems are reduced to ordinary differential systems by using appropriate similarity transformations. The reduced systems are solved numerically by Runge-Kutta fourth order method with shooting technique. The velocity, temperature and nanoparticle volume fraction profiles are discussed for different physical parameters. As well as the Skin friction, Nusselt and Sherwood numbers are analyzed and exhibited graphically. It is found that the thermal radiation enhances the effective thermal diffusivity and the temperature profiles. It is also observed that the Brownian motion parameter strengthens the temperature, showing a decreasing behavior of nanoparticle volume fraction profiles.

**KEYWORDS:** MHD, Tangent Hyperbolic Nanofluid, Thermal Radiation, Zero Normal Flux, Suction/Blowing.

## 1. INTRODUCTION

Boundary layer behaviour over a stretching surface is important as it occurs in several chemical engineering processes, such as polymer extrusion processes and metallurgical processes, which involve cooling of a molten liquid. Sakiadis<sup>1</sup> introduced the study of boundary layer flow over a stretched surface moving with a constant velocity and formulated boundary layer equations for two dimensional and axisymmetric flows. Crane<sup>2</sup> investigated the flow caused by a stretching sheet. On the other hand, Gupta<sup>3</sup> stressed that realistically, stretching surface is not necessarily linear. In view of this, Vajravelu<sup>4</sup> studied flow and heat transfer in a viscous fluid over a nonlinear stretching sheet without viscous dissipation, then Cortell<sup>5</sup> examined flow and heat transfer on a nonlinear stretching sheet for two different types of thermal boundary conditions on the sheet, constant surface temperature (CST case) and prescribed surface temperature (PST case). Prasad et al.<sup>6</sup> studied the mixed convection heat transfer over a nonlinear stretching surface with variable fluid properties.

The most important non-Newtonian liquid model is tangent hyperbolic liquid model and which has certain advantages over other non-Newtonian formulations. Pop and Ingham<sup>7</sup> presented the tangent hyperbolic fluid model and it is extensively used in different laboratory experiments. After that, Nadeem et al.<sup>8</sup> studied the peristaltic transport of a hyperbolic tangent fluid within an asymmetric channel. The tangent hyperbolic fluid model is used by Friedman et al.<sup>9</sup> for large-scale magneto-rheological fluid damper coils. In another study, peristaltic flow of tangent hyperbolic fluid in a curved channel is studied by Nadeem et al.<sup>10</sup> and they explored the behavior of various parameters on pressure rise against flow rate and plotted stream lines to understand the pattern of the flow. Akbar et al.<sup>11</sup> investigated the steady MHD flow of tangent hyperbolic fluid over a stretching sheet. They found that velocity profile decreases by increasing power law index and Weissenberg number but demonstrates opposite results for skin friction. Recently, Salahuddin et al.<sup>12</sup> studied the internal resistance between fluid particles of tangent hyperbolic fluid flow due to a non-linear stretching sheet with heat generation. Waqas et al.<sup>13</sup> investigated On non-Fourier flux in nonlinear stretching flow of hyperbolic tangent material. Arif et al.<sup>14</sup> presented the thermo-physical aspects of MHD tangent hyperbolic fluid flow over a non-linear stretching

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## Inclined Magnetic Field and Viscous Dissipation Effects on Tangent Hyperbolic Nanofluid Flow with Zero Normal Flux of Nanoparticles at the Stretching Surface

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### ABSTRACT

This article presents the effect of inclined magnetic field on the MHD boundary layer flow of tangent hyperbolic fluid with nanoparticles past a stretching surface with viscous dissipation, chemical reaction and convective boundary condition. Condition of zero normal flux of nanoparticles on the wall is used for the concentration boundary condition, which is the current topic that have yet to be studied extensively. The partial differential systems are reduced to ordinary differential systems by using appropriate similarity transformations. The reduced systems are solved numerically by Runge-Kutta fourth order method with shooting technique. The velocity, temperature and nanoparticle volume fraction profiles are discussed for different physical parameters. As well as the Skin friction, Nusselt and Sherwood numbers are exhibited and analyzed. It is found that the viscous dissipation enhances the effective thermal diffusivity and the temperature rises. It is also observed that the inclined magnetic force decreases the velocity field, showing an increasing behavior of temperature and nanoparticle volume fraction profiles.

**Key words:** MHD, Tangent hyperbolic Nanofluid, Zero normal flux, Inclined magnetic field, Viscous dissipation.

### INTRODUCTION

The momentum and heat transfer of the boundary layer flow over a stretching surface have been applied in numerous chemical engineering processes, such as polymer extrusion processes and metallurgical processes, which involve cooling of a molten liquid. Sakiadis [1] initiated studying the boundary layer flow over a stretched surface moving with a constant velocity and formulated boundary layer equations for two dimensional and axisymmetric flows. Crane [2] investigated the flow caused by a stretching sheet. On the other hand, Gupta [3] stressed that realistically, stretching surface is not necessarily continuous. Magyari and Keller [4] analyzed the steady boundary layers on an exponentially stretching continuous surface with an exponential temperature distribution. Elbashbeshy [5] investigated the heat transfer over an exponentially stretching continuous surface with suction. Fathizadeh *et al* [6] proposed a powerful modification of the homotopy perturbation method for MHD flow over a stretching sheet. The most important non-Newtonian liquid model is tangent hyperbolic liquid model and which has certain advantages over other non-Newtonian formulations. Pop and Ingham [7] presented the tangent hyperbolic fluid model and it is extensively used in different laboratory experiments. After that, Nadeem *et al* [8] studied the peristaltic transport of a hyperbolic tangent fluid within an asymmetric channel. The tangent hyperbolic fluid model is used by Friedman *et al* [9] for large-scale magneto-rheological fluid damper coils. In another study, peristaltic flow of tangent hyperbolic fluid in a curved channel is studied by Nadeem *et al* [10] and they explored the behavior of various parameters on pressure rise against flow rate and plotted stream lines to understand the pattern of the flow. Akbar *et al* [11] investigated the steady MHD flow of tangent hyperbolic fluid over a stretching sheet. They found that velocity profile decreases by increasing power law index and Weissenberg number but demonstrates opposite results for skin friction.

A nanofluid is a liquid containing nanometer-sized solid particles, called nanoparticles, which basically increasing thermal conductivity of the base fluids according to an investigation of Choi [12]. Pak and Cho [13] ascribed the increased heat transfer coefficients noticed in nanofluids to the dispersion of suspended particles. Xuan and Li [14]



## MHD Flow of Tangent Hyperbolic Nanofluid over an Inclined Sheet with Effects of Thermal Radiation and Heat Source/Sink

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### Abstract

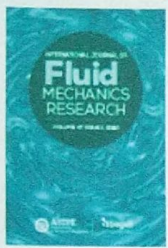
This article presents the effect of thermal radiation on MHD boundary layer flow of tangent hyperbolic fluid with nanoparticles past an inclined stretching sheet with heat source/sink and convective boundary condition. Condition of zero normal flux of nanoparticles at the wall is used for the concentration boundary condition, which is the current topic that have yet to be studied extensively. The partial differential systems are reduced to ordinary differential systems by using appropriate similarity transformations. The reduced systems are solved numerically by Runge-Kutta fourth order method with shooting technique. The velocity, temperature and nanoparticle volume fraction profiles are discussed for different physical parameters. As well as the Skin friction coefficient, Nusselt number and Sherwood numbers have discussed in detail and presented through graphically. It is found that the thermal radiation enhances the effective thermal diffusivity and the temperature rises. It is also observed that the buoyancy parameter strengthens the velocity field, showing a decreasing behavior of temperature and nanoparticle volume fraction profiles.

**Keywords:** MHD; tangent hyperbolic; thermal radiation; mixed convection; inclined sheet

**MSC 2010 No.:** 76A10, 76D99, 76W05, 80A20

### 1. Introduction

The momentum and heat transfer of the boundary layer flow over a stretching surface have been applied in numerous chemical engineering processes, such as polymer extrusion processes and met-



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## RADIATION EFFECT ON MHD FLOW OF A TANGENT HYPERBOLIC NANOFLUID OVER AN INCLINED EXPONENTIALLY STRETCHING SHEET

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### ABSTRACT

The influence of thermal radiation on MHD boundary layer flow of a tangent hyperbolic nanofluid with zero normal flux of nanoparticles over an inclined exponentially stretching sheet in the presence of suction/blowing is studied. The partial differential systems are transformed to ordinary differential systems by using appropriate similarity transformations. The

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# An Efficient, Green synthesis of Ethyl/Methyl 4-(3-Aryl-1-Phenyl-1H-Pyrazol-4-yl)-6-Methyl-2-oxo-1,2,3,4-Tetrahydropyrimidine-5-Carboxylates

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**Abstract** : An efficient, green heterogeneous catalyst was developed for one-pot three component synthesis of Ethyl/methyl 4-(3-aryl-1-phenyl-1H-pyrazol-4-yl)-6-methyl-2-oxo-1,2,3,4-tetrahydropyrimidine-5-carboxylate derivatives by the condensation of aldehydes, acetoacetate, and urea in the presence of 5% WO<sub>3</sub>/ZrO<sub>2</sub> heterogenous catalyst under solvent-free condition.

**Keywords** : One-pot multi component synthesis, Dihydropyrimidones, pyrazoles, heterogeneous catalyst and WO<sub>3</sub>/ZrO<sub>2</sub>.

### Introduction:

Dihydropyrimidones (DHPMs) and their derivatives have gained importance in medicinal chemistry due to their pharmacological applications such as antimicrobial<sup>1,2</sup>, anticancer<sup>3</sup>, anti-inflammatory<sup>4</sup>, analgesic<sup>4</sup>, anti-HIV<sup>5</sup>, antihypertensive<sup>6</sup>, antimalarial<sup>7</sup> activities. DHPMs were also screened as neuro peptide antagonists<sup>8</sup> for treating anxiety<sup>9</sup>, optic nerve dysfunction<sup>10</sup> and antioxidant agents<sup>11</sup>. The DHPMs are most recently emerged as an integral backbone of several drugs used as orally active antihypertensive agents<sup>12-14</sup>, calcium channel blockers<sup>15</sup>, adrenoceptor selective antagonists<sup>16,17</sup>. Monastrol is a derivative of DHPM, a novel cell-permeable molecule that blocks normal bipolar spindle assembly in mammalian cells and therefore causes cell cycle arrest. On the other hand, Biginelli reaction has been known as an efficient one-pot reaction protocol to preparing Dihydropyrimidinones. The Biginelli reaction was attracted renewed attention and many improved procedures were made towards good reaction conditions, and they involved the use of catalysts/reagents, transition metal-based reagents, ionic liquids, polymer-immobilized reagents, microwaves, and ultrasound irradiation. Despite all of the improved methods, organic synthesis methods still have many drawbacks, such as the use of organic solvents, long reaction times, high costs, low yields, nonsustainable catalysts, and purification issues. Keeping in view the above DHPM biological importance and catalytical procedure, our research group has been making considerable efforts for synthesis of DHPM by using more innovative synthetic protocol, it adopting more eco-friendly approach. Owing the facts mentioned above we have synthesized ethyl/methyl 4-(3-aryl-1-phenyl-

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# Fisheries management and fishing techniques used in Nizamsagar dam, district Kamareddy, Telangana State, India

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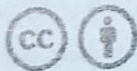
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## ABSTRACT

Fish farming is cultivation of fish in captivity under controlled conditions. At present it is an important and rapidly expanding enterprise all over the world. In various parts of the world, fish farming is an extremely vital part of economy. Fishing is probably oldest and one of the important activity of human kind. Ancient remains of spears, hooks and fish net have been found in ruins of the stoneage. The people of early civilization drew pictures of nets and fishing lines in their arts. The Nizamsagar Dam basin is rich in fish diversity. The traditional 85 fisherman families dependent on fishing occupation like Bhoi, Bagdi and Gosawi communities. Nontraditional peoples are also currently engaged in fishing. Fishing techniques commonly used in Nizamsagar Dam basin are includes different types of fishing gears, such as fish trap, hook and line, bag net, cast net, gill net and drag net. Fish diversity is greatly affected by loss of vegetation along the river increases the intensity of soil erosion and siltation, increasing urbanization, invasion of exotic species, over fishing and agricultural expansion.

**Keywords:** Fish diversity, Nizamsagar Dam, Fisherman Community, Fishing gears, threats.

## INTRODUCTION

Rivers are one of the extensively studied ecosystems world over. It has been illustrated that these ecosystems are the most threatened ecosystem worldwide; De-Francesco *et al.*, (2007), Schuchardt *et al.*, (2008), Abid (2004). Rivers perform important ecological functions such as development of ecosystem, enhance productivity, natural flood control and species diversity conservation (Kamp *et al.* 2007). Natural disturbances like flood and fluvial process continually work together in riparian areas to create unique ecosystem that are essential for biological habitat diversity (Subramanian, 2010). Traditionally inland fishes in rivers provide live hood to the local fisherman communities in the study region. Fish being a good indicator of aquatic habitat health and possible environmental change, the status of any river system can be determined by the quality and quantity of fish species reported from it. (Shukla *et al.* 2013).



# Study of phytoplankton of Mothe River, Jagtial District, Telangana

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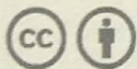
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## ABSTRACT

Phytoplankton which are present were in natural water bodies were studied. Phytoplankton such as Chlorophyceae, Cynophyceae, Basillariophyceae, Euglenophyceae were studied during year 2018-2019. In present investigation, above Phytoplankton were the indicators of water pollution.

**Keywords:** Phytoplankton, Chlorophyceae, Cynophyceae, Mothe River.

## INTRODUCTION

Phytoplanktons were studied from Mothe River, Taq. & District Jagtial, Telangana. Because of presence of Phytoplankton, there are changes of ecological status of Mothe River. Phytoplanktons were the indicator of biological indicators of water pollution. Some phytoplanktons like, *Chlorella*, *Chara*, *Closterium*, *Spirogyra* which are the parts of Palmer's list of sixty more pollution tolerant genera in the world (Palmer, 1969). Most of worker studied the periodicity and the distribution of algae in Indian fresh water bodies. Important contribution are Khan (1992), Jayabhaye (2010) studied on Phytoplankton diversity and stated that, the Clorophyceae form greenish scum on the surface of quite stagnant or grow firmly attached to rock, piece of wood and other object in water. Pawar *et al.* (2011), Negi *et al.* (2011) studied on diversity of phytoplankton and stated that the species diversity was recorded in the Clorophyceae 50% than the other species at stage I. Also Baba *et al.* (2014) Ganai *et al.* (2014) studied on phytoplankton community and observed that the minimum population density of Cyanophyceae were found in June and maximum in May. Present study of Phytoplankton species of Mothe River were studied to find out water pollution of Mothe River.



# Zooplankton based trophic assessment of Mathadivagu Dam District Adilabad Telangana State, India

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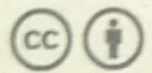
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## ABSTRACT

Mathadivagu Dam near located Adilabad district Telangana studied for zooplankton from July 2018 to June 2019 and data obtained from the present investigation revealed of a total of 28 zooplankton species comprising of 11 species of rotifers, 6 copepods, 8 cladocerans and 2 ostracod. Occurrence of zooplanktons throughout the year of all the four sampling sites indicates oligotrophic nature of dam.

**Keywords:** Zooplankton, trophic assessment, Mathadivagu Dam.

## INTRODUCTION

Zooplanktons are minute aquatic organisms that are non-motile or are swimmers and they drift in water columns of an ocean, sea or fresh water bodies to move any great distance. They are heterotrophic in nature and play important role in food web by linking the primary producers and higher trophic levels. The fresh water zooplanktons comprise of rotifers, *Cladocera*, copepods and ostracodes reported by Sharma (2012). They occupy an intermediate position in the food web. Zooplankton mediate the transfer of energy from lower to higher trophic level studied by Waters (1987), thus zooplankton represent an important link in aquatic food chain and contribute significantly to secondary production in fresh water ecosystem observed by Sharma *et al.*, (1998). The zooplankton concentration and distribution are sensitive to physical and chemical changes in the water studied Ahmad *et al.*, (2011). Zooplanktons also play an important role as indicators of trophic condition in cold, temperate and tropical waters reported by Sharma *et al.*, (1998). Sukand and Patil (2004) recorded four major groups of zooplanktons in their studies on Fort lake Belgaum, Karnataka. Rotifers constituted (52.38%) number of zooplanktons followed by *copepods* 26.5%, *Cladocera* 16.45% and ostracodes 4.67%. In the present investigation we have studied on seasonal variations of Zooplanktons.

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