

SOUVENIR & ABSTRACTS

INTERNATIONAL CONFERENCE

ON

**History and Recent Developments in Mathematics,
with Applications in Science and Technology**

&

**Symposium on Fixed Point Theory
in Memory of Prof. S. L. Singh**

17th - 19th December 2019



**Madhuben & Bhanubhai Patel
Institute of Technology**

(A Charutar Vidyamandal Institution)

P. O. Box No. 8, Beyond GIDC Phase IV, New V. V. Nagar 388121.

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Charutar Vidya Mandal,
Vallabh Vidyanagar



Government Of India
National Board for Higher Mathematics

National Board of Higher Mathematics,
Mumbai



Gujarat Council on Science and Technology,
Gandhinagar



Department of Science & Technology
Government of Gujarat

Department of Science & Technology,
Gandhinagar

ICHDMAST–2019

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Organized By

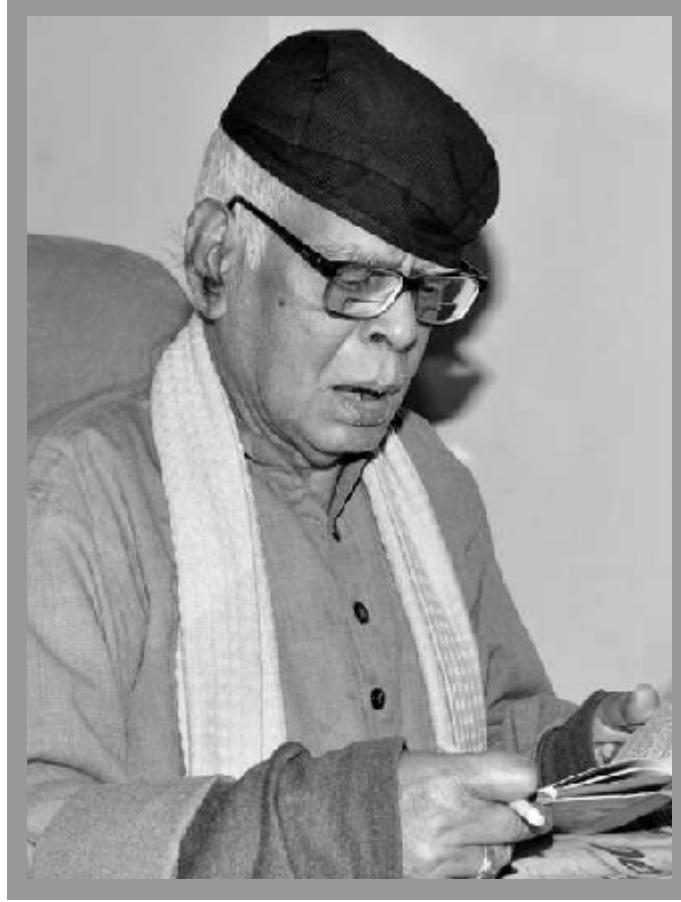
- **Department of Mathematics,**
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- **Indian Society for History of Mathematics**
Delhi.
- **Gujarat Technological University**
Ahmedabad.

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Heartily Tribute to The Great Mathematician



Late Shri Vashishtha Narayan Singh

2nd April 1946 to 4th November 2019



Madhuben & Bhanubhai Patel Institute of Technology
(A Charutar Vidyamandal Institution)

New Vallabh Vidhyanagar 388121, Dist. Anand, Gujarat, India.



Shri Amit Shah
Home Minister, Government of India

Message


I am glad to know that the Madhuben and Bhanubhai Patel Institute of Technology is organizing an International Conference during 17-19, December, 2019 and eminent scholars from across the globe are attending the same.

I am happy to note that the objective of the conference is to provide a platform for exchange of ideas on recent advances in areas relating to Mathematics and Engineering.

I am sure the conference will facilitate inter-disciplinary exchange of ideas in science, engineering and related disciplines, and foster various types of academic collaborations.

I congratulate all those associated in organizing this conference. I wish the event a grand success.

Date : 05/10/2019


(Amit Shah)



Acharya Devvrat

Governor, Gujarat.

Message

I am delighted to know that the Department of Mathematics of MBIT College, New Vallabh Vidyanagar, Anand is going to organise an International Conference on “History and Recent Development in Mathematics with Applications in Science and Technology.” It is also matter of pleasure that Charutar Vidya Mandal is celebrating Platinum Jubilee of its establishment.

I hope this conference will provide an interactive platform to exchange ideas among the mathematicians, academicians and research scholars, regarding the history and recent developments in the field of mathematics.

I wish the conference as well as the publication of souvenir all success.

Date : 25/11/2019

(Acharya Devvrat)



Shri Vijay Rupani

Chief Minister, Gujarat State.

Message

It is heartening to learn that Madhuben and Bhanubhai Patel Institute of Technology, New Vallabh Vidyanagar is organizing an International Conference during 17-19 December 2019 with focus on History and Recent Development in Mathematics, with Application in Science and Technology.

This conference will provide an opportunity to all who are working in and using mathematics in their work to exchange ideas and implement the ideas into practice.

I wish the organizers of International Conference a grand success and may the conference prove to be enlightening to all participants.

Date : 16/10/2019

(Vijay Rupani)



Shri Nitin Patel

Deputy Chief Minister, Gujarat State.

Message

I am very glad to know that the Department of Mathematics of MBIT College -New Vallabh Vidyanagar, Anand is organizing an International Conference on " History and Recent Developments in Mathematics, with Applications in Science and Technology" from 17 - 19 December, 2019 and that a souvenir is being published on this occasion.

Expressing my gratitude to all the professionals and eminent personalities present for this International Conference, let me happily inform all that this Conference will provide a platform to interact and exchange ideas regarding the history of Mathematical Sciences among the eminent Mathematicians of all the countries of the world. I am also sure that the Conference will benefit the young teachers, research scholars and the students of MBIT as well as other colleges regarding the applications of mathematics in other fields of science, engineering and other allied subjects.

I convey my heartfelt congratulations to each and every member of MBIT College for organizing such a Conference and wish this International level Conference a great success.

Date : 15/10/2019


(Nitin Patel)



Ramesh Pokhriyal 'Nishank'

Minister of Human Resource Development, Government of India.

Message

I am glad to learn that the Department of Mathematics, Madhuben and Bhanubhai Patel Institute of Technology, Gujarat is organising an International Conference on “History and Recent Developments in Mathematics, with Applications in Science and Technology” during 17–19 December, 2019.

India, a great repository of knowledge from ancient times, has a rich history of conducting research, bringing out inventions and founding theories of timeless importance. The discovery of “Zero” and “Decimal” is a singular contribution of ancient India without which one cannot contemplate of mathematics today. It is worth recalling that it was Bhaskaracharya, a renowned mathematician who discovered for the first time the theorem in his book “Lilavati” which was centuries later rediscovered and became famous as Pythagoras theorem, In recent times, we are also familiar with the contributions of mathematicians from Bachaspati Mishra to Ramanujan. The Fields Medal laureate Manjul Bhargava, of Indian origin, is widely acclaimed across the world for his pioneering work in the field of Number Theory.

Since, we have a rich heritage of profound and insightful visionaries in the field of Mathematics, It is our foremost duty to carry on this glory forward by making new discoveries and establishing new principles in the field of Mathematics.

I hope the upcoming Conference would have very enriching and fruitful deliberations, I wish the Conference every success.

(Ramesh Pokhriyal 'Nishank')

Date : 21/11/2019

सबको शिक्षा, अच्छी शिक्षा।



Shri Bhupendrasinh Chudasama

Minister of Education, Government of Gujarat.

Message

It gives me an immense pleasure to learn that the Department of Mathematics, MBIT, New Vallabh Vidyanagar, is organizing an International Conference on "History and Recent developments in Mathematics, with Applications in Science and Technology (ICHDMAST 2019)" from December 17 to 19, 2019 and a souvenir is being brought out to mark the occasion.

It is gratifying to note that this conference intends to enrich the knowledge and experience of students and scholars of all parts of the world, particularly, focusing on historical perspectives of mathematics and its application in engineering and technology. As we all know, Mathematics play a very vital role as a driving force in human progress for sustainable economic, industrial and social development. India has made a significant contribution to the advancement of world mathematics.

I am confident that the deliberations, discussions and interaction among senior resource persons, mathematicians and participants will, to a great extent, enrich their knowledge in the scientific and cultural role of mathematics in human civilization and in the future development of mankind.

On this occasion, I convey my warm greeting to the organizers and participants and wish the International conference a grand success.

(Bhupendrasinh Chudasama)

Date : 16/10/2019



Council of Scientific &
Industrial Research



Shri Shekhar C. Mande

Secretary, Department of Scientific & Industrial Research

Message


I am happy to learn that Madhuben and Bhanubhai Patel Institute of Technology (MBIT), Vidyanagar is organizing an International Conference on “History and Recent Development in Mathematics with Applications in Science and Technology” during December 17-19 at New Vallabh Vidyanagar (Gujarat).

Historically, Indian has dominated the field of Mathematics, having pioneered the place value system and use of zero. Ancient Indian mathematicians were one of the first to explore nascent concepts of Algebra and Calculus. Vedic mathematics is also India’s gift to the world. Therefore, the subject matter of the conference is very important.

The International Conference will undoubtedly, enhance the existing scientific network for promoting and strengthening research in the field, and also provide much needed exposure to the young students.

I wish the International Conference all success.

Date : 11/11/2019


(Shekhar C. Mande)




Prof. Subhash Kak

Message

I am very happy to note that the Indian Society of History of Mathematics is organizing an International conference on History and Recent Advances in Mathematics with Applications in Science and Technology (ICHDMAST-2019) during December, 2019 in New Vallabh Vidyanagar, Gujarat. The study of the history of mathematics is essential for understanding the past and the interconnections amongst different cultures and nations. Recent studies have revealed the influence of Indian mathematics on linguistics, computer science, mathematical logic, and perhaps even the modern invention of calculus and I hope this conference will not only bring more clarity to the understanding of these topics but also open up new vistas.

I send my greetings to the participants and wish that the conference is a resounding success.

Date : 05/10/2019


(Subhash Kak)



Shri Prayasvin B. Patel

President, Charutar Vidya Mandal, Vallabh Vidyaagar.
Chairman & Managing Director, Elecon Engineering Co. Ltd.

Message

I am very glad to know that the Department of Mathematics of MBIT College -New Vallabh Vidyanagar, Anand is organizing an International Conference on " History and Recent Developments in Mathematics, with Applications in Science and Technology" from 17 - 19 December, 2019 and that a souvenir is being published on this occasion.

Expressing my gratitude to all the professionals and eminent personalities present for this International Conference, let me happily inform all that this Conference will provide a platform to interact and exchange ideas regarding the history of Mathematical Sciences among the eminent Mathematicians of all the countries of the world. I am also sure that the Conference will benefit the young teachers, research scholars and the students of MBIT as well as other colleges regarding the applications of mathematics in other fields of science, engineering and other allied subjects.

I convey my heartfelt congratulations to each and every member of MBIT College for organizing such a Conference and wish this International level Conference a great success.

(Prayasvin B. Patel)

Date : 06/11/2019



Er. Bhikhubhai B. Patel

Chairman, Charutar Vidya Mandal, Vallabh Vidyaagar.

Message

It gives me an Immense pleasure to learn that the Department of Mathematics, MBIT, New Vallabh Vidyanagar, is organizing an International Conference on "History and Recent developments in Mathematics, with Applications in Science and Technology (ICHDMAST 2019)" from December 17 to 19, 2019 and a souvenir is being brought out to mark the occasion.

It is gratifying to note that this conference intends to enrich the knowledge and experience of students and scholars of all parts of the world, particularly, focusing on historical perspectives of mathematics and its application in engineering and technology. As we all know, Mathematics play a very vital role as a driving force in human progress for sustainable economic, industrial and social development. India has made a significant contribution to the advancement of world mathematics.

I am confident that the deliberations, discussions and interaction among senior resource persons, mathematicians and participants will, to a great extent, enrich their knowledge in the scientific and cultural role of mathematics in human civilization and in the future development of mankind.

On this occasion, I convey my warm greeting to the organizers and participants and wish the International conference a grand success.

(Er. Bhikhubhai B Patel)

Date : 16/10/2019



Shri Manishbhai S. Patel

Vice-President, Charutar Vidya Mandal, Vallabh Vidyaagar.

Message

It gives me great pleasure to learn that the Department of Mathematics, Madhuben & Bhanubhai Patel Institute of Technology (MBIT) New Vallabh Vidyanagar, is organizing an International Conference on "History and Recent Development in Mathematics with Applications in Science and Technology" during December 17-19, 2019.

Historically, India has dominated the field of Mathematics, having pioneered the place value system and the use of zero. Ancient Indian mathematicians were one of the first to explore nascent concepts of Algebra and Calculus. Vedic mathematics is also India's gift to the world. It is therefore extremely commendable that the International Seminar is being hosted by MBIT on the theme "History and Recent Development in Mathematics with Applications in Science and Technology".

The International Conference will undoubtedly, enhance the existing scientific network for promoting and strengthening research in the field, and also provide much needed exposure to the young students.

I wish the International Conference on "History and Recent Development in Mathematics with Applications in Science and Technology" all success and congratulate the organizers on this timely initiative.

Date : 15/10/2019

(Manishbhai S. Patel)



Dr. S. G. Patel

Secretary, Charutar Vidya Mandal, Vallabh Vidyaagar.

Message

At the outset, on behalf of Charutar Vidya Mandal and my personal behalf I congratulate and express my pleasure to the team of ICHDMAST-2019.

This is an international conference which will take place on the campus of Madhuben and Bhanubhai Patel Institute of Technology, New Vallabh Vidyanagar during 17-19 December, 2019. The ICHDMAST 2019 is a flagship conference in the history of Mathematics.


We all know that Mathematics has an ever increasing importance in science and technology. It plays a central role in education and research. Through the windows of the history of mathematics we develop the philosophic eye which looks into the past and traces the line of intellectual development. It helps students to develop a deeper understanding of the mathematics they have already studied by seeing how it was developed over a time and in various places that encourages creative and flexible thinking.

Over the past decade or more, there has been a rapid expansion of applications of mathematics in engineering and technology. Mathematical sciences are the natural language for computation and simulation. Mathematics has been successfully used in the development of science and technology in 21st Century. The areas like advanced semiconductor devices, bio-technology, digital image technology, Nano-technology, artificial satellites & rockets, artificial intelligence and more are based on mathematical concepts.

This conference will act as a bridge which connects the basic sciences with engineering and technology. This conference includes a wide range of topics on history and applications of mathematics in engineering and technology. Eminent speakers, researchers, engineers, students, paper contributors will make this conference a productive one.

I hope that you will find the event informative and enjoyable and convey my best wishes for a Grand Success.

Date : 09/10/2019


(Dr. S. G. Patel)



Indian Society for History of Mathematics

Department of Mathematics, Ramjas College,
Delhi University, Delhi 110007, India. www.indianshm.org



Keynote Address by Conference Chairman

While there is considerable pride in the popular mind associated with history and heritage of the country, of mathematics in particular, a wee bit of reflection would bring the realization that much of the perception involved is on shaky grounds, and not much effort has gone in, or going in, towards putting the subject in proper perspective. In general the engagement with history is seen to be largely driven by motivations that are highly partisan and suspect, to say the least, and not so much by genuine intellectual curiosity as it should be. About mountaineering they say that we climb the mountains simply “because they are there”, the benefits they bring being incidental. Similarly, we ought to be studying history, including of science of mathematics, because “it is there” - we are endowed with access to a whole variety of source material relating to the past, and it ought to be a hallmark of our human spirit to explore them, and get as complete an understanding of the story the materials have to tell us as possible. It is in the nature of things that the exploration would throw up a variety of findings, some that would make us proud of the contributions of our forefathers, others in the nature of missed opportunities from which we could learn, and yet others throwing light on opportunities, and limitations, that aspects of social organization bring to intellectual activity in general. All these should be imbibed so that they guide our actions at a deeper level, rather than just the matters of pride, that are often put to divisive uses.

It is heartening that a few individuals and institutions have done a yeoman service in the cause of building the edifice of history in the Indian context. Apart from the numerous foreign scholars who laid the foundations of the subject in its modern setting, contributions of many Indians, Sudhakara Dwivedi, Bapudeva Shastri, Bibhutibhushan Datta, Avadhesh Narayan Singh, Saraswati Amma, K.S. Shukla, K.V. Sarma, R.C. Gupta, to mention a few, have been invaluable. As to institutions the efforts put in by the Indian National Science Academy deserve a special mention in this respect. A few universities and other educational institutions have also played an important role in sustaining interest in the Subject.

The Indian Society for History of Mathematics, founded by Prof. Udit Narayan Singh in 1978, has been endeavouring to promote healthy interest in history of mathematics through a variety of activities. Publication of *Ganita Bharati* has been one of the major vehicles in this regard, starting from the founding year of the Society, edited for over a quarter century since its inception by Prof. R.C. Gupta - an accomplished historian of mathematics who was awarded the coveted Kenneth O. May Prize in 2009. The Society has also been organizing as a part of its effort annual conferences, in collaboration with various institutions, and many of these have attracted considerable international participation. The Society is thankful to the Madhuben and Bhanubhai Patel Institute of Technology for co-organizing the present event, the sponsors and supporters for making it possible, and to all speakers and delegates for joining in our efforts.

Prof. S. G. Dani
(Conference Chairman)



Madhuben and Bhanubhai Patel Institute of Technology

New Vallabh Vidhyanagar 388120, Anand, Gujarat. India.

Website: www.mbit.edu.in



From the Principal's Desk

Education is much more than mere learning. It's a soul searching exercise committed towards excellence.

MBIT, under the umbrella of Charutar Vidya Mandal, encompasses in itself the entire gamut of skills & knowledge required in formulating the guiding principles which helps the faculty members and students to grow into such individuals who are not only capable of competing with the best in Technology and Engineering but also embodying the values which draw on our best cultural heritage. This dynamic combination empowers them to be the future leaders of tomorrow.

ICHDMAST-19, is an International conference organized by Science and Humanities Department (Mathematics) for academicians across the Globe.

We have received overwhelming response from the eminent personalities, research scholars across the World. Outstanding personalities from the all corners of the World will be gracing this International conference. As a head of the MBIT-Family, I extend a warm welcome to all. I am sure that, there will be a churning of knowledge, interactive sessions during these three days, and it would be fruitful as well as output oriented.

I congratulate the organizing Secretary- ICHDMAST-2019, and her team for successfully organizing this International Conference and look forward to the greater achievements in future.

Prof. Dr. Archana Nanoty
Principal, MBIT.



Madhuben and Bhanubhai Patel Institute of Technology

New Vallabh Vidhyanagar 388120, Anand, Gujarat. India.

Website: www.mbit.edu.in



A Note by the Organizing Secretary

The International Conference on “History and Recent Development in Mathematics with Applications in Science and Technology”(ICHDMAST2019) is being organized by MBIT, New V.V.Nagar in collaboration with Indian Society for History of Mathematics and Gujarat Technological University during 17th -19th December, 2019.

It is a matter of great pleasure that the conference received a great response from the mathematicians, researchers and engineers from different Institutions of the world.

There are about 145 delegates from India and other countries such as USA, Japan, Russia, France, Serbia and Switzerland. We are extremely thankful to all the esteemed delegates who have responded in a positive way and contributed in the conference.

All the talks/papers have been categorized in six different sections:

- | | |
|---|---------------------------------|
| 1) Symposium in memory of Prof. S. L. Singh | 2) Invited Talks |
| 3) Historical Perspectives | 4) Recent Trends in Mathematics |
| 5) Mathematical Applications | 6) Special Student's Session |

There are about 56 invited lectures covering major theme of the conference in its entirety.

The Section on Symposium consists lectures and papers on fixed point theory in the memory of Prof. S. L. Singh. There are about 56 Invited Talks in second section. The historical perspective section consists of papers covering ancient seminal mathematical notions and contribution of regional mathematicians. The fourth section on recent trends in mathematical sciences consists of about 27 papers focused on current research in pure and applied mathematics.

The section on mathematical applications contains about 33 research articles, covering varied programmatic applications of mathematics in the field of engineering sciences. These papers reflect the increasing interest of the younger generation in mathematical sciences. The section on student session consists of papers on history and application of mathematics in various fields of science and technology.

All the abstracts in this book have been included without major editing except minor syntactical or typographical error. We express profuse appreciation to the delegates for their papers as these have been prepared diligently and excellently by them. However editor bears the responsibility of any unintended error that may have crept in to the book.

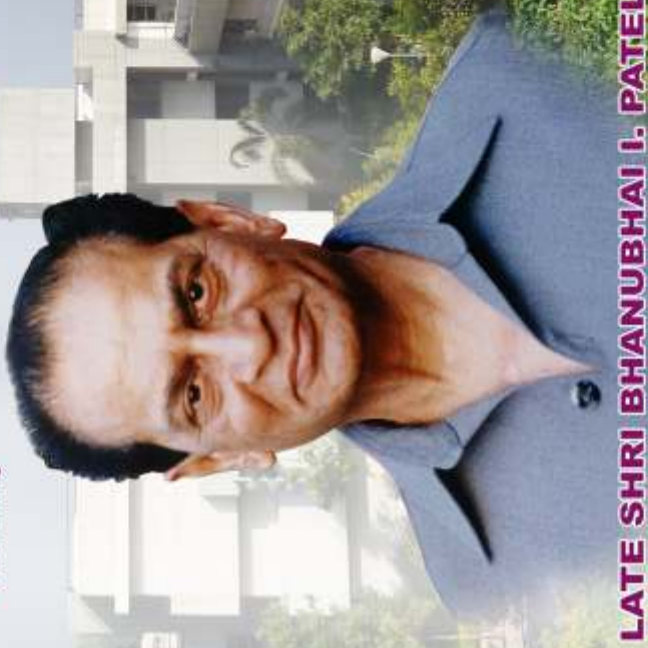
I gratefully acknowledge the cooperation from the delegates, Indian Society for History of Mathematics, Charutar Vidya Mandal, Gujarat Technological University, National Board of Higher Mathematics (NBHM), GUJCOST, DST and IE (Gujarat Section). I also express my gratitude towards Principal MBIT and thankful to Principals of BVM, GCET, ADIT and BBIT, colleagues, students and other staff members of MBIT for their support and guidance. I am thankful to Honorable Chairman, CVM and all the office bearers of CVM for their kind support.

Darshana J. Prajapati
Organizing Secretary



A Charutar Vidya Mandal Institute

MADHUBEN AND BHANUBHAI PATEL INSTITUTE OF TECHNOLOGY



LATE SHRI BHANUBHAI I. PATEL



LATE SMT. MADHUBEN B. PATEL

*A place where students not only study to become an Engineer,
but to serve mankind, by making dreams come true.*

***MBIT welcomes all delegates in
ICHDMAST-2019***

THE INSTITUTE AT A GLANCE



Madhuben & Bhanubhai Patel Institute of Technology

New Vallabh Vidyanagar 388121, Anand, Gujarat. India.

Website: www.mbit.edu.in

Madhuben and Bhanubhai Patel Institute of Technology (formerly known as MBICT) is the iconoclastic spirit of Charutar Vidya Mandal in many aspects. MBIT was established in 2009; epitomizes the commitment of Charutar Vidya Mandal towards academia and society. As on the line of women empowerment, the institute professes to add to the technical quantum competent men and women engineers. As time progressed, CVM realized that real women empowerment lies in co-education because we need to give real exposure of industry to these women engineers. CVM took a giant leap in the direction of women empowerment by converting this college into a co-education institution where women engineers can experience actual scenarios of the corporate world where they will be working with men in the future. The committed staff of MBIT is aware of its responsibility to penetrate the conventional teaching-learning process and prepare a generation of young and competent engineers who can implement technical advances for the betterment of our society.

This institute is located in the satellite township christened New Vidyanagar. It is a peaceful setup on a lush green belt of the region. The campus incorporates two Engineering colleges, one Pharmacy college, an Ayurvedic college, a postgraduate institute of Biotechnology and a college of Business and Management.

Infrastructure is never compromised within CVM institutions. It is housed in four different wings. Apart from large and ventilated classrooms, all the laboratories have state-of-art infrastructure in the real sense of the term. All the laboratories are outfitted with hi-tech equipment. LCD projectors and computers are often used to help the students learn the subject with visual effect. A full-fledged library incorporates volumes and forty-two international and national journals. Separate hostel facility for Girls is available on the campus which includes lodging as well. With a lady warden and a lady faculty as rector, it proves to be a safe harbor for the girls residing in the campus.

The institute has charted out a long-term plan to inculcate its core ideology of social welfare and thus emerge as an exemplary Utopia of academics. At MBIT, students are given ample freedom of experimentation to liberate their conditioned mindsets and thus gradually they are led to the realm of innovative learning. MBIT is committed towards all its stakeholders, continuous quality improvement and better future of society.

MBIT is the land of culture and tradition. The culture of this institute is rich and unique in its own ways. Young people are full of abundant energy, courage, spirit for adventure, imagination, hope and ambition. This insti-





Through the integrated curriculum, students can pursue multiple pathways and disciplines.

Engineers are the backbone of any nation's economic development and with globalization, the competition in all walks of life has just become steeper; an institute like MBIT which is at the top in propagating an excellent environment, caring for human sensitivity and at the same time striving to maintain the quality of education to match the demands of the time, is really a rare one.

tute stands as a pillar of immense expertise. Renowned faculty members create active partnerships with students. They are leading intellectuals and practitioners in their fields, experienced, and collaboration to the classroom. They advise you about career paths and invite you to join their projects or help you design your own.

The multidimensional academic approach fosters critical thinking and creative problem solving, a place where hard work and autonomy coalesce, students are afforded the freedom to explore and chart a unique course of study.





The town is the synthesis of varied cultures, which enable it to evolve and expand the quality life, as well as to foster the environment of creativity amongst the student citizens. Those who stay here always cherish the golden moments of life on the campus. Today, the town has compounded in strength and consolidated itself to take on the challenges of emerging future.

Vallabh Vidyanagar, established fifty-five years ago, carries a rarity of purpose behind its origin and a variety of education with its development and growth. Strategically located between Ahmedabad and Vadodara, Vallabh Vidyanagar today has emerged to be an Active Educational Hub in the Western parts of India. Just six kilometers from India's milk city--Anand, it has made its distinct identity in the sector of education by offering numerous emerging and innovative educational programs and by attracting students from across the globe. Anand is situated between Ahmedabad and Vadodara on the main rail-link and also NH8, about 75 kms from Ahmedabad and 40 km from Vadodara.

Vallabh Vidyanagar is blessed with the beauty of nature. Its lush green trees of different types and kinds have not only made the town environment- friendly, but also created a serene and ever-enjoyable peaceful atmosphere generating synergistic pleasure on the campus. The pollution-free climate, attracting many to make the town their permanent home, adds value to the academic life on the campus.

Vallabh Vidyanagar has all the amenities which major metropolis have; rather it has best of both the worlds - glamour of a big city and simplicity of a small town. On one hand, it captures the current trends of the youth, while it attempts to make those trends meaningful by making the presence of different spiritual centers felt.

The Future Plan

The first fifty years of CVM coincided more or less with the second half of the twentieth century. Judged by any yardstick, these first fifty years of CVM have been immensely successful. The vision, dedication and commitment of the founders of CVM and its subsequent leaders can be seen clearly today in the results of their

tireless efforts. Vallabh Vidyanagar is today an impressive and thriving educational campus in the heart of Charutar, which is itself heartland of Gujarat.

The challenges which our society will face over the next fifty years, which will coincide more or less with the first half of the twenty first century, will in many significant ways be different from those that faced the founders. Our society will make a transition to a knowledge-based economy, urbanization will continue, and the preservation of our environment will be a crucial and critical objective. Water and energy will become relatively scarce, and therefore efficient management of both will be essential. Information Technology will continue to leapfrog and spread, and will become increasingly interleaved with our daily lives.

Naturally CVM must also make future plans which enable it to generate successful responses to some of the challenges which the society is going to face. The primary focus of CVM has always been on education - and producing well-trained youngsters is certainly a major part of any society's response to the future challenges it is likely to face.

From Vallabh Vidyanagar to New Vallabh Vidyanagar

The Beginning

It was iconoclastic of Bhaikaka and Bhikhabhai, the founders, when contrary to general belief that institutions of higher education can be there only in cities, the rural, dusty, undeveloped Vallabh Vidyanagar's first college Vitthalbhai Patel Mahavidyalaya came into existence in 1947, two months before India became free. Birla Vishwakarma Mahavidyalaya (Engineering College) was born the following year (1948) and Bhikhabhai Jivabhai Vanijya Mahavidyalaya (Commerce College) was ushered into existence in 1951. All this despite a swarm of acute problems, mostly financial. Let it be remembered that the engineering college was the first ever started by a private trust in the entire Bombay State which then spanned from Karachi (now in Pakistan) to Dharwad!

Bhailalbhai Dyabhai Patel, later warmly taken to their heart by the people of Gujarat as 'Bhaikaka' had earned reputation for his sense of values, dedication and absolute integrity. He took along with him Bhikhabhai Kuberbhai Patel, endearingly called 'Bhikhabhai Saheb', a dedicated and farsighted teacher, and established the colleges, schools and residential quarters etc. for the staff through Charutar Vidya Mandal and Charotar Gramoddhar Sahkari Mandal. Not only this, they founded Sardar Vallabhbhai Vidyapith (University) within eight years. Visits of several very important persons like Lord and Lady Mount batten, Jawaharlal Nehru and Sardar Patel in quick succession and their expression of high opinion of the boundless courage of the duo's selflessness and practical idealism shot Vallabh Vidyanagar to national fame and the growth and development of the educational township, which now has a short past of merely Sixty Six years but a long history, continued to take place by leaps and bounds. Bhikhabhai expired in 1956. When Bhaikaka entered active politics in 1958 he handed over the reins of administration of Charutar Vidya Mandal to H. M. Patel, popularly called H. M., an ICS officer of great repute. Among other things, he had provided strategic guidance to our country during the partition of India.

H. M. Patel and Development

H. M. nurtured the Mandal with great care and established numerous institutions like Bhailalbhai & Bhikhabhai Polytechnic, Nalini and Arvind Arts College, Kala Kendra College of Fine Arts, Rajratna P.T. Patel Science College, H. M. Patel Institute of English, S. M. Patel College of Home Science, College of Architecture, A. R. College of Pharmacy, I. B. Patel English Teaching School, Higher Secondary Complexes of Arts, Commerce, Science and Home Science, H. M. Patel Career Development Centre and Sardar Patel Renewable Energy Institute etc. Sardar Patel University-run Agro - Economic Research Centre is also his creation. He built hostels for students and started memorial lecture series in the names of Sardar Patel, Bhaikaka and Ishwar Petlikar. He conceived the projects of Vitthal Udyog Nagar and Medical College and Hospital Complex and worked day and night for their establishment on a sound footing.

Dr. C. L. Patel and New Vallabh Vidyanagar

After H. M. Patel passed away the public spirited Dr. C. L. Patel, former Executive Engineer in the Gujarat Electricity Board, succeeded him as Chairman of the Mandal. Endowed with sound realism and solid and unshakable endurance he harnessed his boundless energy in holding aloft the resplendent torch he inherited from his illustrious predecessors and joined the relay race. He founded here in Vallabh Vidyanagar countless self-

financed colleges such as G. H. Patel College of Engineering & Technology (GCET), N.V. Patel College of Pure & Applied Science (NVPAS), Sardar Ganj Mercantile Co-operative Bank Ltd. English Medium College of Commerce & Management (SEMCOM), Institute of Science and Technology for Advanced Studies & Research (ISTAR), Sophisticated Instrumentation Centre for Applied Research & Testing (SICART), S. S. Patel College of Physical Education, C. Z. Patel College of Business Management, Waymade College of Education and Bhikhabhai Saheb PTC College etc. He also set up V&C Patel English Medium Primary School, Sumantbhai P. Patel Primary School, Shapurbbhai Patel Centre for Learning, Centre for Studies & Research on Life and Works of Sardar Vallabhabhai Patel (SRC), Institute of Language Studies and Applied Social Science (ILSASS) etc. The fourth Engineering College of CVM becomes reality in the academic year 2009-'10. Dr. C. L. Patel extensively renovated and refurbished several institutions and extended library buildings and laboratories in these.

In order to create learning opportunities for students at the global level, he signed MoU with a number of foreign universities-Georgia South Western University, Myers University, Malaspina University, University of Herfordshire, British Columbia University, University of Cincinnati and Eastern Michigan University etc. His unquenchable thirst for revitalising the society through quality education propelled Dr. C. L. Patel to take Hanuman leap. He extended the boundaries of Vallabh Vidyanagar and founded New Vallabh Vidyanagar at the trisection of Karamsad, Mogri and Gana. The lush green New Vallabh Vidyanagar, sibling of Vallabh Vidyanagar, was born with a fanfare of trumpets on April 20, 2000. It has now stepping into the Nineteenth year of its birth.

Let us have a bird's eye view of the well-planned New Vallabh Vidyanagar where the mighty Sardar Patel, witness to the prolific development, stands guard. It is a feast to the eyes to witness here the imposing :

1. A. D. Patel Institute of Technology (ADIT)
2. Ashok & Rita Patel Institute of Integrated Study & Research in Biotechnology (ARIBAS)
3. Indukaka Ipcowala College of Pharmacy (IICP)
4. Govindbhai Jorabhai Patel Ayurved College & Research Centre
5. Surajben Govindbhai Patel Ayurved Hospital
6. Chimantbhai M. U. Patel Industrial Training Centre
7. Madhuben & Bhanubhai Patel Institute of Technology (MBIT)
8. C. Z. Patel College of Business Management

Our overview of New Vallabh Vidyanagar cannot be complete unless we see the hostels where more than thirteen hundred students-boys and girls-live in a pollution-free atmosphere. Large play grounds and underground gymnasium hall, something uncommon, are added attractions.

Er. Bhikhubhai Patel & CVM University

Er. Shree Bhikhubhai B. Patel was born in a farmer family of Bharoda, District Anand, Gujarat. Despite a moderate family background, he achieved newer heights in his educational, business and social life. His philanthropic engagement has changed several lives and strengthened many organisations engaged in social welfare.

Er. Shree Bhikhubhai B. Patel got his school education from M U Patel Technical High School, Vallabh Vidyanagar. He received his Bachelor of Engineering (Civil Engineering) degree from Birla Vishwakarma Mahavidyalaya (Sardar Patel University), Vallabh Vidyanagar.

His touch with academics and his passion for the same is reflected in the facts that he has been running school in his village through Bharoda Education Trust, where he is the President since long, and is associated with Sardar Patel Federation. He has served on senate and syndicate of Sardar Patel University, Vallabh Vidyanagar for several years and has made valuable contributions there. He served as member of the Governing Council of Charutar Vidya Mandal for many years. He served Vallabh Vidyanagar Cooperative Bank Limited as member of Board of Directors since 2018, he has been

serving the Board as Chairman. As member and now as the Chairman he has been making impressive contribution in the area of ethical banking.

Er. Shree Bhikhubhai B. Patel has been a great philanthropic person. He has donated a large sum of money for various causes through many organisation across Gujarat. He also inspires his brothers and other family members to join such noble cause too. His NRI friends are always ready to respond to his call for donations, which speaks about his social reputation and image.

Since 21st February, 2018; Er. Shree Bhikhubhai Patel has been serving Charutar Vidya Mandal as Chairman, and has caused many positive changes in its fifty institutions provide education from KG to PG. His vision of an ideal University has prompted him to solicit the status of State Private University named as The CVM University, which has been recently approved by the Gujarat Government. Considering his vision and thoughts, the highest body of Charutar Vidya Mandal, the sponsoring body of The CVM University has appointed him as the President of The CVM University. He has been leading the CVM and the CVM University with vision and strong personal values and ethics.

Er. Shree Bhikhubhai Patel has taken the initiative of mentoring four engineering colleges and he has always supported all innovative ideas. He guided all the institution to implement Centralized Bio-metric System. He took a major step for the progress of MBIT by converting it into Co-Education Institute.





INSTITUTIONS OF CHARUTAR VIDYA MANDAL

Tel. No. (02692) 238400, Fax No. 236493 • Email: cvmandal@hotmail.com

SN	Name of Institutions	Office	Residence
1	V. P. & R. P. T. P. Science College	230011, 9409309407	9586442019
2	Birla Vishwakarma Mahavidyalaya (BVM)	230104, 236672	232364, 9898034464
3	B.J. Vanijya Mahavidyalaya (Commerce College)	230145	234462, 9824534277
4	Nalini-Arvind & T.V. Patel Arts College	230194, Fax 237958	7265084501
5	H.M.Patel Institute of English Training & Research	230193	9512338188
6	Rama Manubhai Desai College of Music & Dance	231849	9898379437
7	S.M. Patel College of Home Science	T/F 230245	9979057152
8	Arvindbhai Patel Institute of Environmental Design (APIED)	235179, T/F 237586	9825358220
9	A.R. College of Pharmacy & G.H. Patel Institute of Pharmacy	T/F 230788	9879021719
10	N.V. Patel College of Pure & Applied Sciences (NVPAS)	T/F 235500	9427382875
11	G.H. Patel College of Engineering & Technology (GCET)	T/F 231651	234975, 9687554941
12	S. G. M. E. College of Commerce & Management (SECOM)	T/F 235624	234729, 9099451897
13	Sophisticated Instrumentation Centre for Applied Research & Testing (SICART)	234966	245095, 9925520338
14	Institute of Science & Technology for Advanced Studies & Research (ISTAR)	T/F 234955	231498, 9825968242
15	A. D. Patel Institute of Technology (ADIT)	T/F 233680	9099063001
16	S. S. Patel College of Physical Education	232696	234991, 9426341992
17	C. Z. Patel College of Business and Management (CZ)	9737555430	9723623658
18	Indukaka Ipcowala College of Pharmacy (IICP)	T/F 229700	9099063123
19	B. & B. Institute of Technology (BBIT)	237240	9428151575
20	Ipcowala – Santram College of Fine Arts	230013, 9979269968	9825041289, 7285882768
21	Ashok & Rita Patel Institute of Integrated Study & Research in Biotechnology & Allied Sciences	T/F 229189	9428811922
22	Govindbhai Jorabhai Patel Institute of Ayurvedic Studies and Research	239122, T/F 235052	9422186085
23	Surajben Govindbhai Patel Ayurveda Hospital and Maternity Home	239122, T/F 235052	9422186085
24	Waymade College of Education (English Medium)	230050	9724334858
25	H.M. Patel Career Development Centre (CDC)	234266	9375031402
26	Chimanbhai M.U. Patel Industrial Training Centre	230798	9723102842
27	Sardar Patel Renewable Energy Research Institute (SPRERI)	231332, F 237982	8160988944
28	Vallabh Vidyanagar Technical Institute	230104	9879256663
29	C.V.M. Higher Secondary Complex - Science Stream (RPTP)	T/F 230760	9925091576
30	C.V.M. Higher Secondary Complex - General Stream (TVPATEL)	230095, 98796 25251	9687571143
31	C.V.M. Higher Secondary Complex-Vocational Stream (Home Science)	231245	9427636053
32	I. B. Patel English School (Secondary)	230343	9898379437
33	I. B. Patel English School (Primary)	233355	9228706226



INSTITUTIONS OF CHARUTAR VIDYA MANDAL

Tel. No. (02692) 238400, Fax No. 236493 • Email: cvmandal@hotmail.com

SN	Name of Institutions	Office	Residence
34	G. J. Sharda Mandir	230393, 234093	9825940761
35	M. U. Patel Technical High School	232099	9824629451
36	S. D. Desai High School	230758	9428497451
37	M. S. Mistry Primary School	231964, 9924163186	234550
38	Vasantiben & Chandubhai Patel English School (CBSE) (V&C)	233325	9898096630
39	Centre for Studies and Research on Life and Works of Sardar Vallabhbhai Patel (CERLIP)	T/F 235777	8347401828
40	Institute of Language Studies & Applied Social Sciences (ILSASS)	230190	234729, 9427403810
41	Madhuben & Bhanubhai Patel Institute of Technology (MBIT)	T/F 230823	7046005844
42	Shantaben Manubhai Patel School of Studies & Research in Architecture & Interior Design (SMAID)	238600	0265-2792762, 94265 59622
43	CVM IAS Academy	234266	9375031402
44	R N Patel Ipcowala School of Law and Justice	230503	6352348083, 9016725438
45	CVM College of Fine Arts	230013	9825041289, 9898888075
46	C. L. Patel Institute of Studies and Research in Renewable Energy	231894	9427603032
47	CVM Institute of Human Resource Development	234266	9099954090
48	Shardaben C. L. Patel I. T. I. for Women	233450	9909212162
49	Kanubhai M. Patel I. T. I. for Engineering Trades	234450	9574430073
50	CVM Health Centre	229551	9426705555





Gujarat Technological University is a premier academic and research institution which has driven new ways of thinking since its 2007 founding, established by the Government of Gujarat vide Gujarat Act No. 20 of 2007. Today, GTU is an intellectual destination that draws inspired scholars to its campus, keeping GTU at the nexus of ideas that challenge and change the world. It is a State University with 486 affiliated colleges in its fold operating across the state of Gujarat through its FIVE zones at Ahmedabad, Gandhinagar, Vallabh Vidyanagar, Rajkot, Surat. The University caters to the fields of Engineering, Architecture, Management, Pharmacy, Computer Science. The University has about 4,00,000 students enrolled in a large number of Diploma, Under Graduate, Post Graduate programs along with the robust Doctoral program.

Prof. (Dr.) Navin Sheth is the Vice-Chancellor of the Gujarat Technological University from December 31, 2016.

GTU has emerged as an International Innovative University in its pursuit of bringing innovation and internationalization in professional education. Also, it has the largest International Experience Program in collaboration with the universities of US, Canada, China and Germany, which offer a unique opportunity to the students to enhance their capabilities and capacities in a global perspective. Its education empowers individuals to challenge conventional thinking in pursuit of original ideas. With a commitment to free and open inquiry, the work of scholars transform the way of understanding the world, advancing – and creating – fields of study.

The vision of GTU is that “To make Gujarat Technological University a World Class University”. The mission of GTU is that “Every single stakeholder of the University should find pleasure in working with GTU”. Following are the objectives of University:

- Make our operations transparent and acceptable to all stakeholders.
- To provide quality education, training, vocation and research facilities to our students.
- To continuously organize and manage Faculty Development Programs (FDPs), Seminars and Conferences.
- Affiliate and Coordinate with Colleges for an effective

education delivery mechanism.

- Timely and efficient conduct of the Examination process.
- To facilitate student’s placements into suitable and meaningful careers and future of their choice.

Within a really short span GTU has achieved several national accolades for its endeavor in bringing excellence in professional education. GTU is a pioneer in introducing some innovative learning methodology like “**Active Learning**”, a classroom created online. The **GTU Innovation Council** is the most active and applauded for its work in the country engaged in training, developing and nurturing the young minds towards an ideology to innovate. GTU’s **Research Week**, a unique concept, is an evaluation process of dissertations of Master’s and Doctoral Program students involving Experts from the Universities across the Globe. GTU’s **Contributor Personality Development Program** and the **Bridge Course** nurture the students with the essential life skills along with the technical knowledge to enable them develop as an individual and a successful professional in the competitive world. The **Industrial Training and Placement Cell** transforms a knowledge seeker into a sought after professional.

The **Post Graduate Research Centres** at GTU are actively involved in several national and international research projects. Each year, GTU hosts several national and international **conferences** to bring together the academicians and industry experts on a single platform for the exchange of knowledge, experiences and best practices in their area of working. GTU has partnered with leading industries and associations like Bosch Rexroth, Oracle, IEEE, NSE, BSE, C-DAC and many more to encourage industry-academia knowledge exchange.

In view of GTU’s ideology of innovation and internationalization, **Designing the Structure of Technological Universities (DSTU)** is a project for reforming technological education across the nation and designing the structure of universities in the contemporary times, involving eminent education stakeholders across the nation.



Indian Society for History of Mathematics

Department of Mathematics, Ramjas College,
Delhi University, Delhi 110007, India. www.indianshm.org

THE FOUNDER OF ISHM

The Indian Society for History of Mathematics

was founded by the late **Professor Udit Narayana Singh** in the year 1978. Professor Singh was born on August 4, 1917 in the District of Varanasi. His early student life and a significant part of his formative years as a mathematician were spent at the Allahabad University, then famed as 'Oxford of the East'. Here, the distinguished analyst B.N. Prasad influenced him and he produced one of the finest doctoral dissertations in mathematics to have ever come out of Allahabad University in 1949. None other than E. C. Titchmarsh, FRS, who called Singh "an extremely talented mathematician", praised the thesis in superlative terms. U. N. Singh then proceeded to the Sorbonne (University of Paris) where he worked under the guidance of the renowned mathematician Szolem Mandelbrojt and obtained the state D.Sc. with mention 'tres honorable' in 1954.



Late Prof. Udit Narayana Singh
(19-11-1920 – 09-04-1989)

An enlightened educationist and mathematician, his contributions are memorable. Numerous honours came his way but he remained the most unassuming of persons. He served with distinction the cause of mathematics and education in numerous capacities. At the time of his untimely death he was on the Madhya Pradesh University Grants Commission where he was instrumental in ushering in a quiet revolution in the higher education set-up of the state. As the Vice Chancellor of the University of Allahabad he was acclaimed as an administrative genius. As Pro-Vice Chancellor of the University of Delhi, and its Vice Chancellor for a time, he was responsible for several innovations that substantially improved the working of several institutions in India.

His work and his life were characterized by an unwavering pursuit of excellence and rectitude. He was responsible for uplifting the standards of the Department

of Mathematics at University of Delhi leading to the international standards. His interests were wide and deep. His profound knowledge of Sanskrit, of the Vedas and of Indian philosophy and culture helped him in having a deep understanding and appreciation of Ancient Indian Mathematics. He foresaw the need and importance to accord the History of Mathematics-in particular the history of Indian mathematics-its rightful place in the context of the country's growth and development. As founder President of the Indian Society for History of Mathematics, he took keen interest in its growth and development. It is a fitting tribute to him that *Ganita Bhāratī* – the Bulletin of the Society – is today among the leading international journals on the history of mathematics.

The Society feels honored in carrying out his legacy beyond 40 years.

It may be in order to mention that the Genius father produced a Genius son in Professor Dinesh Singh, who is currently the Vice Chancellor of the University of Delhi and a name in mathematics on his own.

THE CRUSADER OF ISHM



Late Prof. B. S. Yadav
(31-07-1931 – 24-02-2010)

Professor B S Yadav spear-headed the activities of ISHM for almost three decades.

Born in Mathura, India, he dedicated his whole life to the cause of mathematics and history of mathematical sciences. After obtaining his B Sc (1953) and M Sc (1957) degrees from Agra University and Aligarh Muslim University, respectively, he pursued research in

mathematics at M S University, Baroda, for which he was awarded Ph.D. in 1965. Through his extended research career he made significant contributions to Functional Analysis, Operator Theory, Fourier Analysis and studies

in History of Mathematics. His teaching career started at M. S. University, Baroda (Lecturer, 1956-1964). He then moved to Sardar Patel University, Vallabh Vidyanagar, Gujarat (Reader, 1964-1970), and later to Delhi University (Reader, 1970-1976 & Professor (31.07.1931 – 24.02.2010) (1976-1996). He played an influential role at various universities and Indian boards of studies. Besides serving on numerous important committees such as Academic Council and Research Degree Committee, he worked also as Head of the Department of Mathematics and as Dean of the Faculty of Mathematical Sciences in Delhi University for several years. He was widely traveled, with over 25 visits to various universities abroad, and was a Visiting Professor of Mathematics at Cleveland State University, Cleveland, Ohio, USA during 1987-1988. He was associated with several academic bodies and research journals. He was a founder member of the Indian Society for History of Mathematics, founded by his guide and mentor late Professor Uditā Narayana Singh in 1978. He was deeply emotionally involved with this Society and was the main driving force behind its activities for over two decades. He served the Society as its Administrative Secretary over a long period and was the Editor of the Society's bulletin *Gaṇita Bhāratī* in recent years. His tireless efforts contributed a good deal in creating a new awareness in the study and research in history of mathematics in the Indian context. He inspired many, young and old, to enter into new ventures in the study of ancient, medieval and modern history of mathematics. He continued to be engaged with mathematics to his last breath.

B S Yadav was an organizer par excellence. He organized many national and international conferences, seminars and workshops. He always encouraged the publication of their proceedings and had been anxiously awaiting an early release of his two edited volumes till his last but the cruel hands of destiny did not allow the fulfillment of his wish.

ABOUT ISHM

The Indian Society for History of Mathematics (ISHM) aims to promote study, teaching and education in history of mathematical sciences. It provides a forum for exchange of ideas and experiences regarding various aspects of history of mathematical sciences. In addition to annual conferences, ISHM has been organizing seminars/symposia on the works of ancient, medieval and modern mathematics and has been regularly bringing out its bulletin *Gaṇita Bhāratī* ever since inception.

Scholars, teachers, students and all lovers of mathematical sciences are welcome to join the Society.

ISHM MEMBERSHIP DETAILS

A. Membership terms:

1. The subscribers to the Memorandum of Association and all such persons as the Governing Body (Executive Council) may from time to time admit to membership shall be the members of the Society.
2. Applications for membership shall be proposed and seconded by two members of the Society enjoying their full rights of membership under the rules and regulations of the Society for the time being in force.
3. The Executive Council may refuse to admit to membership any person without assigning any reason for the refusal.
4. The Society shall maintain an up-to-date membership register, recording names and addresses of all the members.

B. There are five types of members of the Society:

1. Founder Members: Persons whose names appear in the Memorandum of Association as desirous of forming the Society will be regarded as the Founder Members of the Society. They will pay membership dues as prescribed for ordinary or life members of the Society.
2. Ordinary Members: Any person interested in the objects of the Society and agreeing to abide by its constitution and byelaws will be eligible for election as an ordinary member.
3. Life Members: Any person who is eligible for election as an ordinary member shall be eligible for election as a life member.
4. Honorary Members: Honorary membership is by invitation only. The council may nominate distinguished persons of eminence as the Honorary Members for a period of two years, provided that the total number of such members at any time shall not exceed five.

C. Rights and Obligations of the Members:

1. All members shall be entitled to receive communications about the activities of the Society, to participate in its conferences without paying the sessional fees, to have free access to the online issues of *Gaṇita Bhāratī* and to get elected as an office-bearer or a member of the Council.

2. Any member whose subscription is in arrears for two consecutive years shall cease to enjoy the rights and privileges of membership.
3. All applications for membership must be duly proposed and seconded by the existing members of the Society which shall be considered and balloted by the Council for election/admission.

D. Application for Membership:

The membership dues payable, on the 1st of January every year are:

Type of Membership	SAARC	Outside SAARC
Ordinary Membership	INR 125.00	USD 30.00
Life Membership	INR 1225.00	USD 300.00

Application for membership may be made on the membership form or on plain paper giving full details including an E-mail address. All cheques, drafts etc. are to be drawn in favour of "Society for History of Mathematics, India" payable at Delhi and must be sent to the Treasurer (Dr. Man Mohan, Department of Mathematics, Ramjas College, Delhi-110007, India; E-mail: manmohan@indiashm.com). Please add INR 50.00/USD 10.00 for all outstation cheques. M. O. is not acceptable.

ABOUT GAṆITABHĀRATĪ

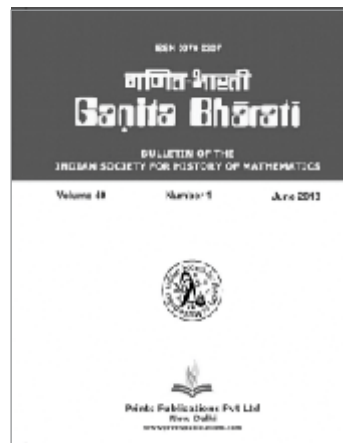
Ganita Bhāratī, the Bulletin of the Indian Society for History of Mathematics is devoted to publication of significant original articles in history of mathematics and related areas. Although English is the official language of the journal, an article of exceptional merit written in French, German, Sanskrit or Hindi will also be considered only as a special case.

Effective Vol.28 (2006), *Ganita Bhāratī* is published bi-annually in the months of June and December, embarking upon not only enlarging the scope of its contents but also recasting its overall appearance. Apart from continuing its emphasis on publishing articles putting the history of ancient Indian mathematics in a proper perspective, the Bulletin aims at welcoming contributions on any kind of world history of mathematics such as: General Histories, Source Books and Biographies of Mathematicians, Mathematics and Indigenous Cultures of the World, The Origin of Mathematics, The 19th and 20th Century Mathematics, Renaissance and History of Mathematics in Education Curricula. In addition, it will have departments like: Review and Survey articles,

Classroom Notes, Dissertation Abstracts, Book Reviews, and Letters to the Editor, Opinions, News Café, International Important Events and Obituary.

The corresponding author of an article published in GB will be entitled to receive that issue free, provided he bears a nominal charge of INR 150.00 (within India) or US\$ 15.00 (outside India), to cover handling and shipping charges by Courier/Air. In addition, the contributing authors would be provided a PDF version of their published work free of cost through E-mail.

SUBSCRIPTION TO GAṆITABHĀRATĪ



Libraries, institutions and other establishments can sub-scribe to *Ganita Bhāratī* directly. Some back volumes (Vol.1-26) are also available at discounted rates, viz. 400.00 (per volume) in India and US\$ 40.00 (per volume) in other countries per volume. (Shipping Charges by Regd. Post or Courier extra which shall be indicated at the time of

sending Invoice/bill).

For Vol. 27 (2005) and back volumes one may contact the Managing Editor (Dr. Man Mohan, Department of Mathematics, Ramjas College, Delhi-110007, India; E-mail: manmohan@indiashm.com)

For Vol. 28 (2006) onwards the hard copy price of GB is INR 1000.00 (per volume) in India and US\$ 100.00 (per volume) in other countries for one year subscription. All communications regarding subscription to Vol. 28-30 must be sent to the publishers directly at the address: MD Publications Pvt Ltd, "MD House", 11 Daryaganj, New Delhi 110 002, India; contact@mdppl.com

SUBMISSION OF MANUSCRIPTS

Articles, dissertation abstracts, letters to the editor, opinions, and news for publication may be submitted online using the *Ganita Bhāratī* Web page at www.indiashm.com. The preferred versions are PDF and MS Word. These may also be submitted by E-mail to the Editor (Professor S G Dani, India; E-mail: ganitabharati@gmail.com, press@indiashm.com) or to any member of the Editorial Board. Books for review must be submitted in duplicate to the Editor.

Papers and articles intended for publication must comprise sufficiently novel and previously unpublished material. These must be prepared conforming to accepted international standards and strictly in accordance with the following instructions.

INSTRUCTIONS FOR AUTHORS

It is preferred that the article is created in MS Word using 12 point Times New Roman type throughout. Once an article has been accepted the final version may be submitted in TeX/LaTeX also, provided a separate PDF file is also sent. The title, numbered equations and tables, should be centered. Everything else must be aligned to the left without any indent. A double space above and below all headings is required. If you use special characters (e.g. Chinese, Cyrillic) other than Latin or Greek alphabets and common mathematical symbols, you must supply PDF files and indicate their placement. In fact a PDF file showing complete article with everything embedded as it should appear in the print, must be supplied.

The main body of the article should be divided by appropriate numbered section and sub-section headings all in upper/lower bold type and aligned to the left. An Acknowledgment section may be included before the list of references. Manuscripts must generally be organized in the following manner:

(i) Title (bold face) followed by author name(s) only [centered], (ii) Abstract and Key Words [centered], (iii) Article Text, (iv) Acknowledgments, (v) References, (vi) Appendices, and (vii) About the Author(s).

The abstract should be followed by three to seven keywords that would be useful in identifying it for reference purposes. The last page of the article should contain the complete mailing address of the corresponding author.

Please avoid using any Footnotes. All references in the text must be cited by author surname and year, like (Smith, 1993) or Smith (1985b). List all the cited references at the end of the article, in alphabetical order of the surnames (writing initials first followed by the surnames), strictly in accordance with the following examples:

J. W. Dauben. The first international connexions in history of mathematics: The case of the Encyclopaedie. *Historia Mathematica*, 26: 343-359, 1999

R. C. Gupta. Sino-Indian interaction and the great Chinese Buddhist astronomer-mathematician I-Hsing. *Ganita Bhāratī*, 11: 38-49, 1989.

G. H. Hardy. *A Mathematician's Apology*. Cambridge Univ. Press: Cambridge, 1988. (Reprinted)

E von Collani. History, State of the Art and Future of the Science of Stochastics. In: Ivor Grattan - Guinness and B. S. Yadav ed. *History of The Mathematical Sciences*, 171-194. Hindustan Book Agency: New Delhi, 2002.

As a last section, the author must provide brief information about each contributing author's coordinates including his/her current affiliation(s), research interests and email addresses. The contact details of the corresponding author must be mentioned at the bottom left corner of the last page. Please use courier new type for all E mail or web addresses.

The corresponding author will receive galley proofs as a PDF file via E mail, to enable him/her to point out any corrections to be made. The corresponding author of each article will receive a PDF file of the final print form of the article by E-mail. The same shall also be uploaded on the web page of the publishers, from where the paper can be downloaded and printouts taken freely.

• **The Membership Form is on Next Page.**



INDIAN SOCIETY FOR HISTORY OF MATHEMATICS

APPLICATION FOR MEMBERSHIP

To, The General Secretary,
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**SYMPOSIUM ON
FIXED POINT THEORY**

**Renu Chugh***Professor, Department of Mathematics, Maharshi Dayanand University, Rohtak**Email: chughrenu1988@gmail.com***Abstract**

A Hungarian Mathematician J. Aczel, defined the functional equation as follows:

“Functional equations are equations in which both sides are terms constructed from the finite number of unknown functions and a finite number of independent variables”.

Functional equations are equations for unknown functions instead of unknown numbers. The field of functional equations is an ever-growing branch of mathematics with far-reaching applications. The theory of functional equations is relatively new and it contributes to the development of strong tools in contemporary mathematics. Functional equations also comprise a traditional branch of Mathematics offering wide scope for algebraic, analytic, order theoretic and topological considerations. Conversely many mathematical ideas in different fields have become essential to the foundation of functional equations. It is increasingly used to investigate problems in other fields such as Mathematical analysis, Combinatorics, Biology, Behavioral and Social sciences, and Engineering. Functional equations arising from the problem of vibration of strings, the parallelogram law of forces or rule for addition of vectors were solved by D’Almbert in 1769. Most likely he was the first person to derive and solve functional equations arising from problems of applied mathematics. Functional equations occur practically everywhere. Their influence and applications are felt in every field of science such as physics, statistics, information theory, engineering etc.

The theory of functional equations is a vast area of the non-linear analysis which is rather hard to explore. The stability problem of functional equations arose from a question of Ulam in 1940. Donald H. Hyer gave a partial affirmative answer to the question of Ulam in the context of Banach spaces that was the first significant breakthrough and a step toward more solutions. In 1978, Themistocles M. Rassias succeeded in extending the Hyer’s theorem by considering an unbounded Cauchy difference.

In the last few decades, various types of functional equations and their stability on various spaces like metric space, Banach space, normed space, random normed spaces, intuitionistic normed space were discussed by many mathematicians. In this talk, an attempt shall be made to highlight the development phases and brief summary about functional equations and their stability.

**ACHIEVEMENTS IN ANCIENT INDIAN SCIENCE:
A REALITY CHECK****R. C. Dimri***Department of Mathematics H.N.B. Garhwal University, Srinagar (Garhwal)**Email: dimrirc@gmail.com***Abstract**

There was significant cultivation of Science in India mainly during the period of 6th century BC to about 11th century AD and we should be proud of for the contributions of India to the world of knowledge in this period. In recent times certain claims are being made about the achievements of sciences in ancient India, due to which it has become necessary to understand the rich heritage of sciences in ancient India in its proper historical perspective, to be able to do a reality check. However, the matter of enquiry is how advanced achievements in all fields of Science and Technology got setback, how Indian science lost its position to European advancements in the field of Science. Some of the researchers, in recent times making claims by mixing science with mysticism, and history with mythology, in order to create an imaginary picture of India’s past glory based on religious chauvinism. In the present talk we shall enquiry about merits and demerits of Indian contributions in the field of Science and Technology. We shall also discuss fidelity behind the claims regarding the Indus and Vedic cultures.

**U. C. Gairola**

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Abstract

The notion of partial metric space was introduced by Matthews in 1994 as a part of the study of denotational semantics of data flow networks. It is widely recognized that partial metric spaces play an important role in constructing models in the theory of computation. After the definition of partial metric space, Matthews proved a partial metric version of Banach's fixed point theorem. In this talk we shall discuss extensions and generalizations of some well known fixed point results in partial metric space.

AMS Subject Classifications: 47H10, 54H25.

**ON CARISTI'S FIXED POINT THEOREMS IN METRIC SPACES WITH A GRAPH AND RELATED PROBLEMS****Dhananjay Gopal**

*Department of Applied Mathematics & Humanities, S. V. National Institute of Technology,
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Abstract

We generalize the Caristi's fixed point theorem for single valued as well as multi-valued mappings defined on a metric space endowed with a graph and w -distance. Particularly, we modify the concept of (OSC)-property due to Alfuraidan and Khamsi[4] and give constructive proof of their stated theorem (Theorem 3.2 in [4]). Consequently, we extend and improve some recent works concerning extension of Banach Contraction Theorem to w -distance with graph e.g. ([1-3]). We also discuss some new problems in this interesting area.

**DIFFERENT SETTINGS OF METRIC AND BANACH CONTRACTION****Mahesh C Joshi**

*Department of Mathematics, DSB Campus, Kumaun University, Nainital
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Abstract

There are several generalizations of metric viz. 2-metric, cone metric, generalized metric, partial metric, G-metric, b-metric etc. The Banach contraction principle, because of its wide applications in different areas of study, has been extended and generalized in these different settings by several researchers. It is well known that the Banach contraction theorem does not characterize the completeness of the metric space. In 2008, T. Suzuki gave a new generalization of Banach contraction principle which characterizes the completeness of the underlying metric spaces. In this talk, we try to give a brief survey of the metric and its generalized forms and also discuss Banach contraction principle in these settings of the spaces.



BANACH CONTRACTION PRINCIPLE - (ALMOST) ONE CENTURY LATER

I 32

Rale Nikolić

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Abstract

Banach contraction principle is perhaps the most widely applied fixed point theorem in all mathematical analysis. This theorem is remarkable because of its simplicity. The theory that developed following this theorem is known as the metric fixed point theory. In this talk we will give brief overview of the most important results from metric fixed point theory. One part of these results concerns the generalization of metric spaces to be worked on. The second part of the results deals with the generalization of contractive conditions that some function needs to satisfy in order to have a fixed point.



FRACTAL TILING USING MATRICES

I 39

Darshana J. Prajapati

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Abstract

In this talk creation of fractal using special kind of matrices are discussed. several fractal Tiling are developed and discussed the procedure in detail. We also discuss the procedure to find sum of geometric series using fractal tiling.



ALTERNATE SUPERIOR BAPTISTA CHAOTIC CRYPTOSYSTEM

I 41

Mamta Rani

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Abstract

In 1998, M S Baptista gave a chaotic crypto system based on partitioning the visiting interval of chaotic orbits of the logistic map which attracted much attention. Since then, many Baptista type cryptosystems have been proposed to overcome the drawbacks of Baptista cryptosystem. One of the major drawbacks of the Baptista algorithm is that the resultant ciphertext is obtained after less number of iterations. So the distribution of ciphertext is not secured enough. To overcome this drawback, we introduce Parameter Switching algorithm along with superior logistic map in Baptista cryptosystem.



SOME UNIQUE FIXED POINT THEOREMS IN METRIC SPACES

I 45

Amit Singh

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Abstract

Fixed point theory is an immensely active area of research due to its wide applications in various fields. ‘Banach Contraction Principle’ plays an important role in metric fixed point theory due to its simplicity and ease of applicability in major areas of mathematics.

In last few years, the metric space in Banach Contraction Principle was generalized to various settings of generalized metric spaces. One of the most interesting generalizations is the notion of partial metric spaces introduced by Matthews in 1994. Later many authors proved various types of fixed point theorems in partial metric spaces. But some authors showed that many fixed point generalizations to partial metric spaces can be obtained from the corresponding results in metric spaces. In 2013, Samet et al proved new fixed point theorems on metric spaces and then deduced analogous results on partial metric spaces. Then many fixed point theorems for different contraction conditions in metric spaces and partial metric spaces were derived. In this talk, we have generalized many previous results including the results of Samet et al.



FIXED POINT AND APPLICATIONS OF DISCONTINUOUS MAPS VIA C*-CLASS FUNCTION IN C*-ALGEBRA VALUED PARTIAL METRIC SPACE

I 49

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Abstract

A C*-algebra is frequently used to explain a physical system in quantum field theory and statistical mechanics and consequently has emerged as an important area of research. Motivated by the fact that the expansion of metric fixed point theory essentially rely on improving the existing contractive conditions or obtaining some variant of a metric space, the concepts of contractiveness and expansiveness in a C*-algebra valued partial metric space are familiarized to create an environment for the existence of fixed point. Some examples to elaborate C*-algebra valued metric space are discussed and it is pointed out that the results in C*-algebra valued metric space cannot be reduced to their metric counter parts unless C*-algebra is taken to be the set of Real numbers. A talk is concluded by solving an integral equation and an operator equation which may be useful in solving real life mathematical models.

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Abstract

In context to Mustafa and Sims' G-metric spaces and its extension that is Roldán's notion of G-metric in any number of arguments, we have derived fixed point theorems on G-metric spaces in any number arguments, also called Gn-metric space without the constraint of ordering on it.

Keywords: G-metric space, fixed point, contractive map, Gn-metric.


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Abstract

In this paper, we introduce the concept of generalized Suzuki type α -Z-contraction with respect to a simulation function ζ in b-metric space and prove the existence of fixed point results for this contraction. Our result extend some known fixed point results.

Keywords: Simulation function, triangular α -admissible mapping with respect to ζ , b-metric space, generalized Suzuki type α -Z-contraction mapping.

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Mahesh C Joshi

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Abstract

The aim of this paper is to obtain a common fixed point result for two mappings satisfying a generalized (ψ, ϕ) -weak contractive type condition in complete metric spaces. Also, our result generalizes some well known theorems in the area of metric fixed point theory.

Keywords: Fixed point, common fixed point, (ψ, ϕ) -weak contraction.



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Abstract

Fixed point theory is a very interesting area of pure mathematics due to its applications in various areas. Basically, it deals with contractive and non-expansive mappings on topological spaces (Normed spaces, Hilbert spaces, Metric spaces etc.) through generalization of various conditions.

The aim of this paper is to present a coincidence point theorem for single-valued mappings on complete metric spaces by using a generalized non-expansive type condition. Moreover, our result generalizes many well known results for non-expansive mappings in the literature.

Keywords: Generalized non-expansive mappings, coincidence point, fixed point, orbitally complete spaces.

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Abstract

It is well known that the contractive mappings are very interesting in this field and Banach Contraction Principle is the most fundamental result in analysis. Thereafter, there are a number of fixed point theorems for contractive type maps in metric spaces.

Recently, A. Hussain introduced the new idea of F-contraction on a closed ball. In this paper we obtain a fixed point for Ćirić type α - ψ F-contraction map on closed ball in complete metric space by taking non-expansive type of condition.

Keywords: F-contraction, closed ball, α -admissible mapping.



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Abstract

The aim of the present paper is to obtain some fixed point theorems by using two approaches ϕ - ψ -contraction and as well as F-contraction. As applications of our results, we obtained solutions to nonlinear eigen-value problems and integral equations. Numerical examples are presented to validate the theoretical findings and to demonstrate that our results extend, generalize and unify the several known results.

Keywords: contractive conditions, ϕ - ψ -contraction, F-contraction and eigen-value.

Ashish Kumar

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Abstract

Banach contraction principle (BCP) is the fundamental result in fixed point theory. Alber and Guerre-Delabriere gave a new direction to the study of fixed point theory by formulating new class of maps called weakly contractive maps, these maps are known to contain a variety of non-linear contractions such as Banach, Boyd and Wong type and Reich type contractions as its special cases. On the other hand Kada, Suzuki and Takahashi studied a new distance function known as w -distance and used it to generalize Caristi's fixed point theorem, Ekeland's variational principle, and non convex minimization theorem of Takahashi. In the present paper we obtain our results taking an antecedent condition to weakly contractive type map and utilizing the concept of w -distance in the framework of a metric space. Our results generalize, among other, the theorems of Lakzian et al., Popescue, Doric, Dutta and Choudhury, Singh et al.

Keywords and Phrases: Weakly contractive maps, w - distance, fixed point, Suzuki type contraction.

AMS Subject Classification: 47H10, 54H25.



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Abstract

In 2000, Brianciari introduced a concept of v -generalized metric space by replacing 'triangular inequality' to 'quadrilateral inequality'. After this paper, there is a very huge development in v -generalized metric spaces about its topology and other fixed point theorems.

In this paper we discuss the topology of v -generalized metric space and general fixed point theorems of metric spaces which are extended to v -generalized metric spaces.

Keywords: Generalized metric space, Fixed points.

COMMON FIXED POINTS FOR GENERALIZED MULTIVALUED CONTRACTION MAPPINGS ON WEAK PARTIAL METRIC SPACES

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Abstract

In this paper, we define multivalued generalized contraction map and establish a common fixed point theorem for this map in the setting of newly introduced weak partial metric space which generalize some well-known results of partial metric space in the literature.

Keywords: Weak Partial metric space, Almost Partial Hausdor metric, common fixed point.

AMS (MSC) : 47H10, 54H25.



FINITE FRAME THEORY : A REVIEW

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Abstract

Hilbertspace theory has many applications to various areas of pure mathematics, applied mathematics and engineering. Frames are basically generalizations of orthonormal bases in Hilbert spaces. They have many of desirable properties of bases, while differing in a very important aspect: they may be linearly dependent, and therefore the uniqueness of representation characteristic of bases may be lost. This redundancy makes frames very useful in the study of signal and image processing. Members of a frame need not be linearly independent but still serve as building blocks for other vectors of the space and are able to recover every vector of the space fully. Now a days, Frames are among main tools for the applications in wavelet analysis, signal processing, image processing, data compression, sampling theory, optics, filter banks, signal detection, time frequency analysis etc. In this paper, we will discuss about the crucial properties of frames in Hilbert space and Banach space.

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M. C. Joshi

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Abstract

The metric space structure involved in fixed point theorems plays an important role in the existence of fixed point. Various researchers extended the metric space structure and proved fixed point theorems. Some important extensions are b-metric space, cone metric space, partial metric space, ν -generalized metric space and F-metric space etc.

In this paper, we present a brief survey on techniques employed in Banach Contraction principle for different metric space structures. We also discuss some generalized fixed point theorems in these spaces.

Keywords : metric space, partial metric space, cone metric space, fixed point and common fixed point.



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Abstract

In the present work, we propose some sufficient conditions to obtain the existence of common fixed points for a pair of self-mappings satisfying Lipschitz-Kannan type condition. Our work extends and improves some fixed point results due to Kannan, Reich, Subrahmanyam, Jungck, and many others.

Keywords: fixed point, Lipschitz-Kannan type conditions, common fixed point.



FIXED POINT THEOREMS IN D^* METRIC SPACES FOR SIX WEAKLY COMPATIBLE MAPPINGS FOR INTEGRAL TYPE MAPPINGS

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Prachi S Patel

Government Engineering College, Dahod, Gujarat, India.

Abstract

In the Present Paper, we give some new definitions of D^* -metric spaces and we prove a common Fixed Point theorems for six mappings under the condition of weakly compatible mappings in complete D^* -metric spaces. We get some improved versions of several fixed point theorems in complete D^* -metric spaces.

Keywords: D -metric, contractive mappings, Complete D^* -metric spaces, common fixed point theorems



LIST OF PARTICIPANTS

Part 1 : Invited Speakers

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
01	A'Campo, Norbert	University of Basel, Switzerland. norbert.acampo@unibas.ch	From Functions to Foliation and Contact Structures
02	Acharya,U.P.	Madhuben and Bhanubhai Institute of Technology New V.V Nagar -388121, Gujarat, India upachaarya@mbict.ac.in	Cartesian Product of Graphs and its Generalization
03	Aravinda, C.S.	TIFR Center for Applicable Mathematics, Sharadanagara Bangalore -560065, Karnataka, India aravinda@math.tifrbng.res.in	Harish-Chandra - The Mathematician and The Artist
04	Bandi, Shrenik.	Professor & Adviser , Department of Mathematics IPS Academy, Indore (Affiliated to 5 Universities) Indore -452007, Madhya Pradesh, India shrenik.band@gmail.com	The Value of π in Ancient Indian Vedic and Jaina Texts
05	Chaudhary, V. K.	Mathematics and Statistics Section, Department of Basic Sciences Directorate of Extension Education Parmar University of Horticulture and Forestry, Nauni, Solan (H.P) vkc_uhf@reddiffmail.com	Mathematical Models for Prediction
06	Chauhan, N .C.	Professor & Head, Department of Information Technology, A D Patel Institute of Technology New V.V Nagar -388121, Gujarat, India	Important Mathematical Elements for Neural Networks, Support Vector Machine and Convolutional Neural Networks
07	Chugh, Renu	Professor & Head, Department of Mathematics, Maharshi Dayanand University Rohtak -124001, Haryana, India chughrenu1988@gmail.com	Some Aspects of Stability of Functional Equations
08	Damljanovic, Nada	Associate Professor, Department of Industrial Management Faculty of Technical Sciences, University of Kragujevac 65, Svetog Save St. -32102, Serbia nada.damljanovic@ftn.kg.ac.rs	Bisimulations for Weighted Automata over Semirings and Lattices

Part 1 : Invited Speakers

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
09	Dani , S. G.	Professor, UM-DAE Centre for Excellence in Basic Sciences (CBS) Vidyanagari Campus of the University of Kalina, Mumbai - 400098 , India & President, ISHM shrigodani@gmail.com	Construction of right angles in the Sulvasutras
10	Dimri, R. C.	Professor & Head, Department of Mathematics, H. N. B. Garhwal University, (Garhwal) Garhwal -246174, Srinagar , Uttrakhand, India. dimrirc@gmail.com	Achievements in Ancient Indian Science : A Reality Check
11	Gairola, U. C.	Professor, Department of Mathematics, H. N. B. Garhwal University, BGR Campus Pauri, Pauri Garhwal -246001 , Uttarakhand, India ucgairola@rediffmail.com	Fixed Point Theorems and Partial Metric Spaces
12	Ghodadra, Bhikha Lila	Associate Professor, Department of Mathematics, Faculty of Science, MSU, Vadodara -390 002 , Gujarat, India bhikhu_ghodadra@yahoo.com	Absolute Convergence of Multiple Fourier Series
13	Gongopadhyay, Krishnendu	Department of Mathematical Sciences, Indian Institute of Science Education and Research (IISER) Sector 81, Mohali, S.A.S. Nagar -140306 , Punjab, India krishnendug@gmail.com	Reversible Elements in Classical Geometries
14	Gopal, Dhananjay	Department of Applied Mathematics & Humanities, S. V. National Institute of Technology, Surat -395007 , Gujarat, India gopaldhananjay@yahoo.in	On Caristi's Fixed Point Theorems in Metric Spaces with a Graph and Related Problems
15	Gotkhindikar, Dilip Krushaji	Krishnaprabha, 8, Saubhagya Nagar, Gangapur Road, NASHIK -42203 , Maharashtra, India dkgotkhindikar@gmail.com	Some Kaparekar Numbers
16	Hasmani, A. H.	Professor & Head, Department of Mathematics, Sardar Patel University V. V. Nagar -388120 , Gujarat, India ah_hasmani@spuvvn.edu	Lanczos Potential – an Analogy between Electromagnetism and Gravitaty

Part 1 : Invited Speakers

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
17	Hooda, D. S.	Former PVC, Kurukshetra University, Honorary Professor (Mathematics), GJ University of S &T, Hisar and, Adviser® to ABV Hindi University Bhopal -452001 , MP, India ds_hooda@rediffmail.com	Fuzzy Soft Set Theory and Its Application in Dimension Reduction and Medical Diagnosis
18	Ingale, Shraddha	P.G. Department of Mathematics and Research Centre New Arts, Commerce and Science College Ahmednagar -414001 , Maharashtra, India ingaleshraddha01@gmail.com	Data Science and Soft Computing : (Decision Making using Fuzzy Logic in Medical Field)
19	Jadhav, Dipak	Govt. Boys Higher Secondary School, Anjad Dist. Barwani (M. P.), India. dipak_jadhav17@yahoo.com	On the Term Vipulatva Found in the Mahābhārata
20	Jain, Anupam	Professor of Mathematics and Incharge Principal, Govt. College Sanwer, Sanwer (Indore)-453 551 Madhya Pradesh, India anupamjain3@rediffmail.com	Zero in Jaina Literature
21	Jain, Pragati	Associate Professor, Department of Mathematics Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore , Madhya Pradesh, India dr.pragatijain@gmail.com	Mathematics of Dhavalā Tikā
22	Joshi, Mahesh C.	Professor, Department of Mathematics DSB Campus, Kumaun University, Nainital , Uttarakhand. mcjoshi69@gmail.com	Different Settings of Metric and Banach Contraction
23	Katre, S. A.	Chair Professor, Lokmanya Tilak Chair C/o Department of Mathematics, Savitribai Phule Pune University Pune -411007 , Maharashtra, India sakatre@gmail.com	Use of Kuttaka Method in RSA Cryptography
24	Kichenassamy, Satyanad	Professor of Mathematics, Université de Reims Champagne-Ardenne F-51687 Reims Cedex 2, France , satyanad.kichenassamy@univ-reims.fr	Brahmagupta's Apodictic Discourse

Part 1 : Invited Speakers

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
25	Limaye, Medha S.	Research Scholar, F-2, 302, Vijaynagar Society, Swami Nityanand Marg, Andheri (E) Mumbai - 400069 , Maharashtra, India medhalimaye@gmail.com,	Conceptual Understanding of Quadrilaterals and Triangles via Constructions in <i>Śulbasūtras</i> - a pedagogical Tool
26	Mehta, Rekha	Former Professor, Department of Mathematics Sardar Patel University V.V.Nagar – 388120 , Gujarat, India vvnspu@yahoo.co.in	Calculus, Archimedes to Newton and Beyond
27	Mehta, Jay	Assistant Professor, Department of Mathematics, Sardar Patel University, V. V. Nagar - 388120 , Gujarat, India jay_mehta@spuvvn.edu	Elliptic Curves and its Applications in Cryptography
28	Mishra, Lakshminarayan	Department of Mathematics, School of Advanced Sciences, Vellore Institute of Technology (VIT) University, Vellore - 632014 , Tamil Nadu, India. lakshminarayanmishra04@gmail.com	Some Recent Progress in Hybrid Dynamical Systems
29	Mishra, Vishnunarayan	Associate Professor, Department of Mathematics, Indira Gandhi National Tribal University, Lalpur, Amarkantak - 484887 , Madhya Pradesh, India vishnunarayanmishra@gmail.com	Some Generalization Approximation Theory for Stancu Type Integral Operators
30	Mukhopadhyay, Parthasarathi	Associate Professor, Dept. of Mathematics, Ramakrishna Mission Residential College (Autn.), Narendrapur [Affiliated to The University of Calcutta] Calcutta -700103 , West Bengal, India dugumita@gmail.com	Glimpses of Ancient Indian Mathematics
31	Nanoty, Archana	Principal, Madhuben and Bhanubhai Institute of Technology, New V. V. Nagar -388121 , Gujarat, India principal@mbict.ac.in	Analysis of Multilevel Inverters for Induction Motor using Matlab Software
32	Nikolić, Rale	Associate Professor, Department of Mathematics, Metropolitan University, Tadeuša Koščuška 63, 11000 Belgrade , Serbia. rale.nikolic@metropolitan.ac.rs	Banach Contraction Principle - (Almost) One Century Later

Part 1 : Invited Speakers

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
33	Pai, Venketeswara	Assistant Professor, Department of HSS IISER Pune - 411 008 , Mharashtra, India venpai79@gmail.com	An Overview of Vākyakaraṇa of Parameśavara
34	Papadopoulos, Athanase	Institut de Recherche Mathématique Avancée (Université de Strasbourg et CNRS) 7 rue René Descartes, 67084 Strasbourg Cedex, France athanase.papadopoulos@math.unistra.fr	Foliations in Geography
35	Patel, N. M.	Associate Professor, Department of Computer Engineering, BVM, V. V. Nagar - 388120 , Gujarat, India nmpatel@bvmengineering.ac.in	An Introduction to Mathematical Image Processing & its Applications
36	Pathak, V. D.	Faculty of Technology & Engineering, M.S.University of Baroda, Vadodara -390 001 Gujarat, India vdpathak@yahoo.com	Factorial Functions and its Generalization by Prof. Manjul Bhargava
37	Plofker, Kim	Associate Professor, Department of Mathematics, Union College Schenectady, NY 12308 USA plofkerk@union.edu	Some Results on Convergence of Sequences and Series in Sanskrit Mathematics
38	Pokhariyal, Ganesh Prasad	Professor, School of Mathematics University of Nairobi, P.O. Box 30197, Nairobi, Kenya pokhariyal@uonbi.ac.ke	Role of ECM Stiffness and Energy in the Growth of Cancer in Humans
39	Prajapati, Darshana J.	Associate Professor of Mathematics, Madhuben and Bhanubhai Institute of Technology, New V.V. Nagar -388121 , Gujarat, India djprajapati@mbict.ac.in	Fractal Tiling using Matrices
40	Prajapati, Jyotindra C.	Associate Professor, Department of Mathematics Sardar Patel University V.V Nagar -388120, Gujarat, India jyotindra18@rediffmail.com	Some useful Special Functions of Technology and Engineering
41	Rani, Mamta	Department of Computer Science, Central University of Rajasthan, Kishangarh, Ajmer -305817 , Rajsthan, India. mamtarsingh@gmail.com	Alternate Superior Baptista Chaotic Cryptosystem

Part 1 : Invited Speakers

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
42	Shah, Vipul	G H Patel College of Engineering & Technology, V. V. Nagar -388120 , Gujarat, India vipulshah@gcet.ac.in	What Makes us Tempted to Incorporate History While Teaching
43	Sharma, Chander Kant	Assistant Professor, Department of Astrology Mewar University, NH- 79, Gangrar, Chittorgarh - 312901 , Rajasthan, India. chanderkant00@gmail.com	भास्कराचार्य रचित लीलावती ग्रन्थ का गणितशास्त्र में योगदान
44	Sharma , Priyanka	Professor (IT) & Director Institute of Research & Development (IR&D), Raksha Shakti University, At. Lavad, Ta. Dahegam, Gandhinagar - 382305 , Gujarat, India. dir_rd@rsu.ac.in	Application of Computational Models of Artificial Intelligence
45	Singh, Amit	Department of School Education, Govt. of Jammu and Kashmir Srinagar -190001 , Jammu & Kashmir, India singhamit841@gmail.com	Some Unique Fixed Point Theorems in Metric Spaces
46	Singh, Twinkle	Applied Mathematics and Humanities Department, SVNIT, Surat - 395007 , Gujarat, India twinklesingh.svnit@gmail.com	Approximate Analytical Method and its Application
47	Sinkevich, Galina I.	Associate Professor, Saint-Petersburg State University of Architecture -190005, Saint Petersburg, Russia galina.sinkevich@gmail.com	The First 19th Century Classes in the Theory of Functions
48	Sriram, M. S.	Prof. K.V. Sarma Research Foundation, Chennai , India. sriram.physics@gmail.com	<i>Śulvasūtra</i> - Inspired Rational Approximations to Integers
49	Shrivastava, Omkar Lal Shrivastava, Sumita	Head, Department of Mathematics Govt. Kamladevi Rathi Girls P. G. College, Rajnandgaon 491441 , Chhattisgarh, India omkarlal@gmail.com	Historical Development of Fermat Numbers and Contribution of Nemichandra
50	Tomar, Anita	Professor and Head, Government Degree College Thatyur, Tehri Garhwal -249001 , Uttarakhand, India. anitatmr@yahoo.com	Fixed Point and Applications of Discontinuous Maps Via C^* -Class Function In C^* -Algebra Valued Partial Metric Space

Part 1 : Invited Speakers

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
51	Trivedi, Kiran R.	Associate Professor Electronics & Communication Engineering Department, S.S. Engineering College, Bhavnagar -364060 , Gujarat, India krtrivedi@gmail.com	The Amazing Application of Matrix Calculus in Computer Vision in Artificial Intelligence
52	Vaidya, Arun M.	Retd. Professor, Department of Mathematics, Gujarat University, Ahmedabad . Gujarat, India arunvaidya3@gmail.com	Some Unlikely but Amazing Men of Mathematics I Have Met
53	Vasavada, Mahavir H, Vasavada, H. M.	Former Professor & Head Department of Mathematics, Sardar Patel University V. V. Nagar -388120 , Gujarat, India hemahavir@gmail.com	Gujarat Ganit Mandal
54	Yamada, Sumio	Professor, Department of Mathematics, Director of the International Centre, Gakushuin University International Centre, Toshima-ku, Tokyo, Japan yamada@math.gakushuin.ac.jp	On Development of Relativity from 1900 to 1920
55	Zhukova, Alena	Assistant Professor from Saint-Petersburg State University St Petersburg -199034, Russia zhukovaaddress@gmail.com	Spherical Geometry in the Saint-Petersburg Academy of Sciences
56	Žižovic, Mališa	Assistant Professor, Faculty of Technical Sciences Čačak, University of Kragujevac, Serbia . zizovic@gmail.com	Presentation of One New Method of Multi-Criteria Analysis for Evaluation and Decision Making by Dominant Criterion
57	Ramasubramanian K.	L166 Cell for Indian Sc & Tech in Sanskrit, Dept. of HSS, IIT Bombay Powai, Mumbai 400 076 L166, Maharashtra, India. kramas@iitb.ac.in	A Glimpse at the Ganitakaumudi of Narayana Pandita
58	Muni, Vijayakumar S.	Assistant Professor, Department of Mathematics, Sri H. D. Devegowda Govt. First Grade College, Paduvalahippe, Hassan 573211, Karnataka, India. vijayakumarmuni0@gmail.com	Impulsive and Delay Control Systems: History, Mathematical Achievements and Perspectives



Part 2 : Paper Participants

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
01	Acharya, P. B.	Associate Professor, Department of Education, S. P. University, V. V. Nagar - 388120 , Gujarat, India	Innovative Practices in Teaching Mathematics
02	Acharya, U.P.	Assistant Professor, MBIT, New V. V. Nagar - 388121 , Gujarat, India. upachaarya@mbict.ac.in	The Role of Graph Theory in Various Field
03	Amin, Bhumi	Department Of Mathematics, Faculty Of Science, The Maharaja Sayajirao University Of Baroda, Vadodara -390002 , Gujarat, India bhumi95amin@gmail.com	Fixed Point Theory in Generalized Metric Spaces in Any Number of Arguments
04	Ankammarao, Mallela	Research Scholar, Department of Mathematics, A. V. V. M. Sri Pushpam College, Poondi, Thanjavur - 613503 , Tamilnadu, India. sweetyanand2018@gmail.com	A Gumbel Max Distribution Model for Endorphin Hormone Secretion Using Fuzzy Approach
05	Antal, Swati	H.N.B. Garhwal University BGR Campus, Pauri Garhwal - 246001 , Uttarakhand, India. antalswati11@gmail.com	Generalized Suzuki Type α -Z-Contraction in b-Metric Space
06	Arya, Mahesh Chandra	Department Of Mathematics, Govt. Degree College Rikhnikhal Pauri Garhwal -246149 , Uttarakhand, India mcarya1986@gmail.com	Some Fixed Point Theorems in Complete Metric Space
07	Ashish	Assistant Professor, Department of Mathematics, Govt. College Satnali, Mahendergarh , Hariyana, India. akrmisc@gmail.com	Discrete Dynamical Behaviour in Modulated Difference Maps
08	Ayar, M. S.	Mechanical Engineering Department, BVM Engineering College V. V. Nagar - 388120 , Gujarat, India. mayurayar31@gmail.com	Design and Optimization of the Gating System Through Continuity Equation for Sand Casting
09	Bhargav, Binta H.	Assistant Professor, Mechanical Engineering Department, MBIT, New V. V. Nagar - 388121 , Gujarat, India bhbhargav@mbict.ac.in	Conic Sections: Graphical Methods in Mechanical Engineering

Part 2 : Participants List

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
10	Bhargav, Binta H.	Assistant Professor, Mechanical Engineering Department, Madhuben and Bhanubhai Institute of Technology, New V. V. Nagar - 388121 , Gujarat, India bhbhargav@mbict.ac.in	Double Cone – Anti Gravity Cone
11	Bhargav, Binta H.	Assistant Professor, Mechanical Engineering Department, Madhuben and Bhanubhai Institute of Technology, New V. V. Nagar - 388121 , Gujarat, India bhbhargav@mbict.ac.in	Real World Applications of Conic Sections
12	Britto, Manoj A.	Assistant Professor of Mathematics, Anjalai Ammal-Mahalingam Engineering College, Kovilvenni, Tiruvapur - 614403 , Tamilnadu, India. brittomanoj@gmail.com	A Mathematical Model for Balanced Diet Using Nonagon Fuzzy Number
13	Chandra, N.	Department of Mathematics, S. N. S. Govt. PG Degree College, Narayan Nagar - 262550, Pithoragarh , Uttarakhand, India cnaveen329@gmail.com	A Coincidence Point Theorem for Generalized Non-Expansive Mappings
14	Chauhan, Ankita	Assistant Professor, Computer Engineering Department, MBIT, New V. V. Nagar - 388 121 , Gujarat, India. apchauhan@mbict.ac.in	A Literature Survey on Importance of Statistical Methods for Data Mining
15	Chaudhari, T. V.	Assistant Professor, ASH Department, ADIT, New V. V. Nagar - 388121 , Gujarat, India. trupti1328@ymail.com	Some Properties of Product of Wheel Family
16	Contractor, Kalindi	Department of Mathematics, P. T Science College, Surat -395001 , Gujarat, India	On the Solutions for MHD Boundary Layer Flow of Generalized Non-Newtonian Fluids in a Porous Medium
17	Das, Khushbu J.	Research Student, Department of Mathematics, Veer Narmad South Gujarat University, Surat -395007 , Gujarat, India khushbudas14@gmail.com	Recursive Subsequence of Various Fibonacci-Type Sequences
18	Dave, Akash	MBIT, New V. V. Nagar - 388121 , Gujarat, India. aadave@mbict.ac.in	Load Balancing in Cloud Computing Environment using Mathematical Analysis: A Review

Part 2 : Participants List

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
19	Deena, Sunil	Assistant Professor, Department of Mathematics Indira Ghandhi National Tribal University, Amarkantak , M.P., India sunil.deena007@gmail.com	Computational Fluid Dynamics in Science and Technology
20	Donga, Jayna	Asst. Professor, Computer Engineering, MBIT, New V. V. Nagar - 388121 , Gujarat, India. jdonga@mbict.ac.in	A Review of Computer Science Algorithms with the Graph Theory of Mathematics
21	Gaikwad, S. N.	Professor, Dept. of Mathematics, Gulbarga University, Gulbarga 585106 , Karnataka, India sngaikwad2009@yahoo.in	Onset of Double Diffusive Convection in a Maxwell Fluid Saturated Anisotropic Porous Layer with Soret Effect – an Analytical Study
22	Garakoti, Neeraj	Department of Mathematics, DSB campus, Kumaun University Nainital - 263001 , Uttarakhand, India. neerajgarakoti@gmail.com	Fixed Point Theorems for F-Contraction in Metric Spaces
23	Jha, Ashwini Kumar	Asst. Prof., CE Department, MBIT New V. V. Nagar - 388 121 , Gujarat, India. akjha@mbict.ac.in	Game Theory: A Comprehensive Review
24	Joshi, Bharti	Graphic Era Hill University, Bhimtal Campus, Nainital - 263156 , Uttarakhand, India bhartijoshi20592@gmail.com	Some Fixed Point Theorems Using Contractions Conditions and its Applications
25	Kawane, Leena	Department of Mathematics, N. V. Patel Science College of Pure And Applied Sciences, V. V. Nagar - 388120 , Gujarat, India leena.kawane@gmail.com	Fuzzy-Valued Continuous Function with the Level Sets
26	Khare, Vishwas	Assistant Professor, Department of Mathematics, SSR College of ACS, Silvassa 396230 , UT of Dadra Nagar Haveli, India. vskssr@gmail.com	Algorithm in Sagemath to Find Determining Equations for Infinitimals of PDE of First Order Using Lie Symmetry
27	Korvadiya, Shraddha	Assistant Professor, Computer Engineering Department, MBIT, New V. V. Nagar - 388120 , Gujarat, India. sdkorvadiya@mbict.ac.in	A Survey on Matrix Multiplication Algorithms

Part 2 : Participants List

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
28	Kumar, Ashish	Department of Mathematics, Himalayan School of Science and Technology, Swami Rama Himalayan University, Dehradun - 248016 , Uttarakhand, India ashishpasbola@rediffmail.com	Fixed Point Theorems in Metric space with w-distance
29	Kumar, Rohit	Department of Mathematics, DSB Campus, Kumaun University, Nainital - 263001 , Uttarakhand, India. rohitk0351@gmail.com	A Survey on v-Generalized Metric Spaces
30	Makwana, Komal	Assistant professor, Parul University, Waghodia, Vadodara - 391720 , Gujarat, India komal.makwana@paruluniversity.ac.in	Evaluation of Teachers Perfor- mance in Academic Review Committee at Parul University by Mutli-Criteria Fuzzy Decision-making Approach
31	Manikandan, P.	Assistant Professor of Mathematics, AnjalaiAmmal-Mahalingam Engineering College, Kovilvenni , Tiruvarur - 614403 , Tamilnadu, India. brittomanoj@gmail.com	A Mathematical Model for Nutrient Value of Grain Legumes Using Octogonal Fuzzy Number
32	Mathpal, Dipti	Assistant Professor, MBIT, New V. V. Nagar - 388121 , Gujarat, India dmathpal44@gmail.com	A Survey on String Matching Algorithms for Text Mining
33	Mehra, Chetna	Department of Mathematics DSB Campus, Kumaun University, Nainital - 263001 , Uttarakhand, India.	Frame Theory and its Applications : A Review
34	Nagar, Abhishek Yogeshkumar	P.G Scholar, Electrical Engineering Department BVM Engineering College, V. V. Nagar - 388120 , Gujarat, India. abhinagar23@gmail.com	Hybrid Reactive Power Compensation Using Co- ordinated Control strategy and Clarke Transformation
35	Nagare, Amol R.	Design & Development Executive, Kaizen Engineering, Ahmednagar , Maharashtra, India.	Valuation of Bus Seat Comfort using Fuzzy Reasoning Expert System.
36	Negi, Smita	Department of Mathematics H. N. B. Garhwal University, BGR Campus, Pauri Garhwal - 246001 , Uttarakhand, India. smitanegi.sn@gmail.com	Common Fixed Points for Generalized Multivalued Contraction Mappings on Weak Partial Metric Spaces

Part 2 : Participants List

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
37	Pardis, Ahmad Salim	PG Student, Electrical Engineering Department, BVM Engineering College, V. V. Nagar - 388120 , Gujarat, India salim.pardis156@gmail.com	“Power System Stability Improvement by FACTS Devices: Comparison of STATCOM, SSSC and UPFC” Using the Optimization Technique and Differential Equation.
38	Parihar, Neha	Research Student, School of Mathematics Devi Ahilya Vishwavidyalaya, Indore - 452 001 , (MP) India. songaraneha@gmail.com	Development of Fuzzy Soft Metric Spaces
39	Parikh, Krupal	ASH Dept., GCET College, V. V. Nagar -388120 , Gujarat, India krupalparikh@gcet.ac.in	Journey of Regression Analysis from Statistical Methods to Soft Computing Techniques
40	Parmar, Tarun	P.G. Scholar, Electrical Engineering Department, BVM Engineering Collage, V. V. Nagar - 388120 , Gujarat, India tarunparmar71@live.com	Applications of Vedic Mathematics in Competitive Examinations
41	Patare, Udayraj M.	Student, Department of Mathematics Ahmednagar College, Ahmednagar , Maharashtra, India	Application of Linear Algebra for Reduction of High Dimensional Data and Principal Component Analysis
42	Patel, Atmiya	CE Department, MBIT, New V. V. Nagar - 388121 , Gujarat, India. aapatel@mbict.ac.in	Mathematics Behind Blockchain Algorithm
43	Panchal, Priyanka	Assistant Professor, Department of Information Technology, MBIT, New V. V. Nagar - 388121, Gujarat, India. ppanchal@mbict.ac.in	A Survey: Linear Algebra for Cryptography Application
44	Patel, K. P.	Assistant Professor, ASH Department, MBIT, New V. V. Nagar - 388121 , Gujarat, India kppatel@mbict.ac.in	The Laplace Transforms and Their Properties
45	Patel, Bhailal P.	Assistant Professor & Head, Department of Mathematics, N. V. Patel College of Pure and Applied Sciences, V. V. Nagar 388120 , Gujarat, India bppatel74@gmail.com	Fractional Calculus: History, Definitions and Applications

Part 2 : Participants List

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
46	Patel, Bhavisha	P. G. Scholar, Electrical Engineering Department. BVM, V. V. Nagar - 388120, Gujarat, India bhavishapatel92@gmail.com	Analysis & Modeling of Single-Phase Dynamic Voltage Restorer for Voltage Sag Mitigation Using Linear Equation.
47	Patel, Gautam	Research Scholar, Department of Mathematics, Veer Narmad South Gujarat University, Surat - 395007, Gujarat, India gautamvpatel26@gmail.com	Reproducing Kernel for Neumann Boundary Conditions with Improved Inner Product
48	Patel, Hardik	P.G. Scholar, Electrical Engineering Department, BVM Engineering Collage, V. V. Nagar - 388120, Gujarat, India heddypatel@hotmail.com	Application of Mathematics in Various Control Schemes for Hybrid Multilevel Inverter for PV Application to Improve Power Quality.
49	Patel, Niru C.	Research Scholar, Department of Mathematical Sciences, P. D. Patel Institute of Applied Sciences, CHARUSAT, Changa - 388421, Gujarat, India nirupatel.maths@charusat.ac.in	Magnetic Fluid Based Squeeze Film Between Curved Porous Annular Plates Considering Rotation of Magnetic Particles and Slip Velocity
50	Patel, Rima Pravinbhai	Lecturer, Department of Humanities and Science, Mahavir Swami College of Polytechnic, Gujarat Technical University, Surat - 395017, Gujarat, India. rimapatel25@gmail.com	Periodicity of Pell Sequence
51	Patel, S. N.	Assistant Professor, Applied Sciences and Humanities Department, M. B. Patel Institute of Technology, New V. V. Nagar - 388121, Gujarat, India skpatel@mbict.ac.in	The Laplace Transforms and Their Properties
52	Patel, Tapan	Trainee Assistant Professor, Mechanical Engineering Department, Madhuben and Bhanubhai Institute of Technology, New V. V. Nagar - 388121, Gujarat, India tpatel@mbit.ac.in	Conveyor Pulley Design Using Finite Element Method
53	Patel, Kaushal	Assistant Professor, Department of Mathematics, Veer Narmad South Gujarat University, Gujarat, India kbpatel@vnsgu.ac.in	Mathematical Modeling and Stability Analysis of a Reservoir

Part 2 : Participants List

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
54	Pathak, Shreekant	Department of Mathematical Sciences, N. V. Patel College of Pure and Applied Sciences, V. V. Nagar - 388120 , Gujarat, India. shreekant@nvpas.edu.in	Analytic Solution of Imbibition Phenomenon Arising in Heterogeneous Porous Media
55	Pauriyal, Neha	Department Of Mathematics DSB Campus, Kumaun University, Nainital , Utrakhand, India. nehapauriyal1996@gmail.com	Finite Frame Theory: A Review
56	Pimpalkar, Nandkishor T.	Waymade College of Education V. V. Nagar - 388120 , Gujarat, India. nandkishorpimpalkar@gmail.com	Ancient Indian Mathematicians and Their Contributions.
57	Prajapati, Darshana J.	Associate Professor, ASH Department, MBIT, New V. V. Nagar - 388121 , Gujarat, India. djprajapati@mbict.ac.in	Design of a Color Palette Based Image Steganography Algorithm for Fractal Images.
58	Prakasam, S.	Assistant Professors, Department of Mathematics, A. V. V. M. Sri Pushpam College, Poondi, Tiruvarur - 614403 , Tamilnadu, India. prakasamspcmaths@gmail.com	A Mathematical Model for The Effect of Parathyroid Hormone using Fuzzy Laplace Distribution.
59	Raj, Heenaben A.	Applied Science & Humanities Department G. H. Patel College of Science and Technology, V. V. Nagar - 388120 , Gujarat, India. heenaraj@gcet.ac.in	Identifying the Factors Affecting on Student's Academic Performance in Engineering Mathematics.
60	Rathod, Nidhi	ADIT ME (signal processing and communication) New V. V. Nagar - 388121 , Gujarat, India nidhirathod034@gmail.com	Deep Learning Based Algorithm for Image Captioning
61	Roghelia, Aakar N.	Assistant Professor, Department of Mathematics, BVM Engineering College, V. V. Nagar - 388120 , Gujarat, India. aakar.roghelia@bvmengineering.ac.in	1729 : Ek Saat Do Nau
62	Sanghvi, Rajesh C.	Assistant Professor, ASH Department, GCET, V. V. Nagar - 388 120 , Gujarat, India rajeshsanghvi@gcet.ac.in	An update in the Teaching Learning Process

Part 2 : Participants List

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
63	Sati, Monika	Department of Mathematics H. N. B. Garhwal University (A Central University) S. R. T. Campus Badshahithaul TehriGarhwal -249199, Uttarakhand, India. monikasati123@gmail.com	Evolution of Purely Electric and Purely Magnetic Weyl's Tensor in a Space time
64	Singh, Manish Chandra	D. S. B. Campus, Kumaun University, Nainital -263001, Uttarakhand, India. manishnegi380@gmail.com	On Techniques Employed in Fixed Point Theorems for Various Settings of Metric Space
65	Singh, Narendra Kumar	D. S. B. Campus, Kumaun University, Nainital - 263002, Uttarakhand, India. nsijwali@gmail.com	A Common Fixed Point Theorem using Asymptotic Regularity
66	Vaghasiya, Charmi	P.G. Scholar, Electrical Engineering Department. BVM Engineering Collage V.V Nagar -388120, Gujarat, India vaghasiyacharmi9099@gmail.com	Winding Voltage of Phase Shifting Transformer Using Vector Calculation and Phasor Diagram.
67	Vaghela, Shefal H	Research Scholar of Pacific Academy of Higher Education & Research University, Udaipur (Raj.) S. P. B. Patel Engineering College, Linch, Government Engineering College, Dahod - 389151, Gujarat, India shailesh.patel@saffrony.ac.in	Fixed Point Theorems in D^* Metric Spaces for Six Weakly Compatible Mappings for Integral Type Mappings
68	Varsoliwala, Archana C.	Research Scholar, Applied Mathematics and Humanities Department, S. V. National Institute of Technology, Surat - 395007, Gujarat, India archanavarsoliwala@gmail.com	Solution of Non Linear Partial Differential Equation Arising in Longitudinal Dispersion Phenomenon
69	Malik, A. K.	Associate Professor, Department of Mathematics, B.K. Birla Institute of Engineering & Technology, Pilani, Rajasthan. ajendermalik@gmail.com	An Inventory Model with Maximum Life Time for Non-instantaneous Deteriorating Items



Part 3 : Presenters of Student's Session

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
01	Badwaik, Abhishek, Patel, Priya, Sanghavi, Isha, Rathod, Prashansa	Department of Computer Engineering, Madhuben and Bhanubhai Institute of Technology, New V. V. Nagar - 388121, Gujarat, India. abhivalu123@gmail.com,	Phythagoream Theorem and its Applications
02	Hathi, Shivani, Joshi, Dhruva, Aghera, Happy, Dudhagara, Mirva	Department of Computer Engineering, Madhuben and Bhanubhai Institute of Technology, New V. V. Nagar - 388121, Gujarat, India. hathishivani@gmail.com ,	Applications of Linear Algebra
03	Kharat, Atul Patel, Rohan Rugved, Koshiya Patel, Vishwesh	UG Student, Computer Engineer, MBIT, New V. V. Nagar - 388212, Gujarat, India. rugvedkoshiya2002@gmail.com	Application of Golden Ratio in Nature
04	Khuha, Lucky, Trivedi, Yash, Patel, Shrey	Department of Computer Engineering, Madhuben and Bhanubhai Institute of Technology, New V.V Nagar -388121, Gujarat, India. luckykhuha123@gmail.com,	Space Time Concept
05	Kodvani, Sweta M. Shah, Nitya	UG Student, MBIT, New V. V. Nagar - 388121, Gujarat, India. swetakodvani10@gmail.com	A Comparitive Study of Sorting Algorithms
06	Makwana, Prince Virani, Jemish, Patel, Krupa, Patel, Jinal	UG Student, MBIT, New V. V. Nagar - 388121, Gujarat, India. makwanaprince0912@gmail.com	A Survey of AI Techniques used in E-Commerce
07	Mistry, Zalak B. Khokhariya, Avani	UG Student, MBIT, New V. V. Nagar - 388121, Gujarat, India. mistryzalak99@gmail.com	Solving Travelling Salesman Problemusing Ant Colony Optimization
08	Morsaniya, Sanskruti Dharsandia, Dancy, Desai, Sunaina	UG Student, MBIT, New V. V. Nagar - 388121, Gujarat, India. sanskrutimorsaniya21@gmail.com	A Survey on Methods of Vedic Maths
09	Oza, Ameeras A. Patel, Svar, Kaneriya, Poojan Padaliya, Zenith	UG Student, MBIT, New V. V. Nagar - 388121, Gujarat, India. ameerasoza08@gmail.com	Mathematics used in Neuroscience

Part 3 : Presenters of Student's Session

Sr. No.	Name (Prof./Dr./Mr./Ms.)	Designation - Affiliation - Email	Title
10	Patel, Riddhi, Patel, Dhrasti, Patel, Yakshi, Patel, Dhrasti	Department of Computer Engineering, MBIT, New V. V. Nagar - 388121, Gujarat, India. riddhipatel980511@gmail.com,	Cyber Security and Mathematics
11	Patel, Alok Patel, Mit	UG Student, Computer Department, B.V.M. Engineering College V. V. Nagar - 388121, Gujarat, India.	Prime Numbers and their Analysis
12	Patel, Om D Chhag, Vandan, Chauhan, Mandeep, Patel, Maharshi	UG Student, MBIT, New V. V. Nagar - 388121, Gujarat, India. patel20m002@gmail.com	A Role of Mathematics in Computer Science
13	Shah, Dev K, Shah, Arya, Singh, Sudhanshu, Trivedi, Krutarth	UG Student, MBIT, New V. V. Nagar - 388121, Gujarat, India. Indiavdevshah@gmail.com	Use of Matrices in Computer Graphics Application
14	Shah, Krish.M, Vahora, Fatima, Vanani, Nishi	Computer Engg. Department, MBIT, New V. V. Nagar - 388121, Gujarat, India. krishshah242660@gmail.com,	A Survey of RLC Network Circuit using Mathematics
15	Shah, Shakshi Shah, Harit	MBIT College, G. H. Patel College of Engg. & Tech. New V.V Nagar -388120, Gujarat, India, shahharit010@gmail.com	The Importance of Mathematics in the Development of Science and Technology
16	Thakor, Kanu, Joshi, Jay, Jha, Samir, Gor, Vedansh	UG Student, MBIT, New V. V. Nagar - 388121, Gujarat, India. kanuthakor10203@gmail.com	Use of Mathematic Methods in Machine Learning
17	Trivedi, Dhvani	5th Semester, EC Engineering, BVM Engineering College, V. V. Nagar - 388121, Gujarat, India. dhwanitrivedi999@gmail.com	AI Enabled Wearable for Human Gesture Recognition



SECTION - A
INVITED TALKS



FROM FUNCTION TO FOLIATION AND CONTACT STRUCTURES

Norbert A'Campo

University of Basel, Switzerland.

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Abstract

Functions are basic to Mathematics. We start with a study of C^∞ -functions with values in \mathbb{R} on a real vector space V . We are interested in functions that are locally as 'simple' as possible. Here "simple" means that for a well chosen of C^∞ -coordinate functions $g = f - f(p)$ at a given point p should be of a particular expression in these coordinate functions.

For instance, if f is constant near p then $g = 0$ and $f(p + h) = f(p)$ for small h . We say that the function is locally constant at p .

Next, slightly more complicated, we want that at p we have for a good choice of coordinate functions $(x_1, x_2, x_3, \dots, x_n)$ the expression $g(p + h) = x_1(h)$. In this case we say that the function is regular locally at p .

The implicit function Theorem tells us that such a choice of coordinate functions is possible if the differential $(Df)_p : V \rightarrow \mathbb{R}$ does not vanish.

Next, even more complicated, we want that at p for a good choice of coordinate functions $(x_1, x_2, x_3, \dots, x_n)$ one of the expressions $g(p + h) = x_1(h)$ or $g(p + h) = \pm x_1^2(h) + \pm x_2^2(h) + \dots + \pm x_n^2(h)$ holds. In this case we say that the function is regular as before or with a Morse singularity at p .

Let M be a compact connected C^∞ manifold.

We want to study functions $f: M \rightarrow \mathbb{R}$ that are locally at each point of one of the above types. Typical local to global problems can appear.

In the first case the function is constant, no problem. Functions of the second type do not exist since at each maximum the differential vanishes. Functions of the third type exist and lead to the so-called Morse Theory.

The concept of codimension - one foliation is a weakening of the concept of regular function, such that on many compact manifolds this kind of "functions" exist. Locally, like regular functions foliations have levels which are codimension-one submanifolds.

The concept of foliation was introduced by Charles Ehresmann. The tool corresponding to the Implicit Function Theorem is much older and was introduced by Jacobi, Clebsch, Deahna and Frobenius. This tool is the so-called Frobenius Integrability Condition for 1- differential forms ω . The condition is, as opposite to the case of regular functions, a local identity $\omega \wedge d\omega = 0$ together with $\omega_p \neq 0$.

Very interesting is a strong negation of this identity, namely $\omega \wedge (d\omega)^{\wedge n} \neq 0$ on $2n + 1$ manifolds. It leads to the concept of a contact structure.

In the talk, I plan to explain main examples and results.





CARTESIAN PRODUCT OF GRAPHS AND ITS GENERALIZATION

I 02

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Abstract

There are many graph products defined in graph theory. Among them the fundamental products are Cartesian product and tensor product (direct product). These products are commutative and associative. Therefore, they have been widely investigated by many mathematicians.

I concentrate on the Cartesian product of two graphs, which is defined in terms of adjacent vertices or equivalently vertices at distance 1. We generalize the Cartesian product of graphs using the vertices at distance r and defined r -Cartesian product graphs. In this talk, I discuss 2-Cartesian product of graphs. Also, I discuss some graph parameters for Cartesian product as well as 2-Cartesian product of graphs.

Keywords: Cartesian product, 2-Cartesian product, Bipartite graph, Euler graph. **2000 Mathematics subject classification:** 05C76



HARISH-CHANDRA - THE MATHEMATICIAN AND THE ARTIST

I 03

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Abstract

This will be a non-technical talk on the life of Harish-Chandra mainly focusing on his singular evolution as one of the most impactful mathematicians of the last century.



THE VALUE OF π IN ANCIENT INDIAN VEDIC AND JAINA TEXTS

I 04

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Abstract

India is recognized as one of the most important ancient country where the civilizing process was initiated and developed. The remarkable contribution of Indian scholars to the field of mathematics is well mentioned and explained in ancient Indian Vedic and Jaina philosophical texts. India's oldest written works are the Vedas. It is mentioned that for the construction of fire places and Altars, Menstruation and Geometry was needed.

The texts which deal with geometry and mensuration are called Sulba-Sutras. They represent, in the coded form, the much older and traditional Indian mathematics developed for construction of Altars of various designs. The Sulba - Sutras are thus oldest geometrical treatises simply known as Sulbas which means cord, rope or string to measure. There are 10 Sulba Sutras in which Baudhayana, Apastamba, Katyayana and Manava Sulba-Sutra are important.

The value of π was one of the approximation used in ancient and medieval times especially in Jaina Works. K. Hunrath derived it from a dodecagon (12 sided figure) a century ago and G. Chakravarti from a octagon fifty years ago. An ancient derivation is given by Madhavachandra (1000 AD) in his Sanskrit commentary on Tiloyasara, a Jaina text of Nemichandra. Use of the process of averaging was also used to find the value π .

Ancient Indian mathematical contribution with special reference to the value of π is explored in this paper with the help of Vedic and Jaina texts which are in ancient Indian languages. Some important derivations for the value of π are also discussed in this paper. The Vedic and Jaina contribution in the field of mathematics is remarkable and it is of around 500 BC or may be of earlier period. However the various textual evidences lead to the conclusion that the Indians knew the value of π in ancient time. Later on New and better approximation were also found by Indian mathematicians.



I



MATHEMATICAL MODELS FOR PREDICTION

I 05

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Abstract

A mathematical model is an equation or set of equations which represents the relationships among the variables. Modelling may lead to less adhoc experimentation, as models sometimes make it easier to design experiments to answer particular questions or to discriminate between alternative mechanisms. Modelling provides powerful tools for investigating the dependence and nature of relationship among the variables of interest. The relationship among variables must be determined for the purpose of predicting the values of one or more variables on the basis of observation on other variables. Model building is currently applied in many fields i.e. Engineering & Technology, Human Resources Development, Financial Management, Business Management, Industry and Modern Sciences (Prasad, 2010). Numbers of mathematical models are available in the literature to know the real behaviour of past studies and to present the future behaviour of present studies. Standardization of model, fitting of model and testing of the model in specific study in technologies, management and modern sciences is very much require today by the research workers and policy makers to minimizing the time, cost and reliability. This research paper gives a brief over view on the Standardization, fitting and validity testing of important mathematical models.



I



IMPORTANT MATHEMATICAL ELEMENTS FOR NEURAL NETWORKS, SUPPORT VECTOR MACHINE AND CONVOLUTIONAL NEURAL NETWORKS

I 06

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Abstract

Machine learning and deep learning are important interdisciplinary fields used for learning from data. Most important machine learning and deep learning algorithms like neural networks (NN), support vector machine (SVM) and convolutional neural networks (CNN) work based on strong mathematical foundation. This talk describes some of very important mathematical concepts used by these algorithms.

The accuracy of any machine learning and deep learning algorithms depend on effective optimization of their free parameters. Gradient descent is an important algorithm for optimization of free parameters (coefficients) in a multi-dimensional space. This talk elaborates basics of gradient descent, problem of vanishing gradient, its solution and their role in learning neural networks and convolutional neural network. The talk also discusses basic concepts of SVM that transforms data to high dimensional feature space and optimize them for classification and regression.

Many times overtraining or under training may affect prediction accuracy of learning model for unforeseen data. The talk discusses the concept of bias vs. variance learning trade-off to avoid overtraining or under training. The talk also discusses role of different transfer/activation functions such as sigmoid, soft-max, ReLU and other kernel functions during training of NN, SVM and CNN. An important popularity factor for deep learning networks is their capacity of automatic feature extraction from data/images. The talk elaborates concepts of convolution which is important for CNN and many of its variants.



BISIMULATIONS FOR WEIGHTED AUTOMATA OVER SEMIRINGS AND LATTICES

I 08

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Abstract

Simulation and bisimulation relations are a very powerful tool that have been used in many areas of mathematics and computer science to match moves and compare the behaviour of various systems, as well as to reduce the number of states of these systems. The main aim of this paper is to show that the conjunction of two concepts, uniform relations and bisimulations, provides a very powerful tool in the study of equivalence between weighted automata over semirings and lattices.

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CONSTRUCTION OF RIGHT ANGLES IN THE SULVASUTRAS

I 09

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Abstract

Sulvasutras are works composed in the first millennium BCE, in aid of the activity of construction of the Vedic altars and fireplaces - the latter was of paramount importance in the life of the Vedic people, and had evolved into an elaborate affair, involving in particular large-sized intricate geometrical figures. As with various present day pursuits involving geometry, the task of constructing right angles, at a given point on a given line, turned up as a basic component in this respect. This talk, after a general introduction to the Sulvasutra literature and its overall features, will focus on how right angles were produced, and the theory and practice around it, as manifest in the compositions.



ABSOLUTE CONVERGENCE OF MULTIPLE FOURIER SERIES

I 12

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Abstract

The study of absolute convergence of Fourier series is one of the most important problems of Fourier Analysis and the problem has been studied intensively by many researchers. In this talk, we shall review first the known results on the absolute convergence of single Fourier series and then multiple Fourier series. At the end, we shall discuss our results proved recently. If time permits, we shall discuss proofs of our results.



SOME KAPAREKAR NUMBERS

I 14

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Abstract

Great Indian mathematician late D. R. Kaparekar made immense contribution to the field of mathematics. He was a passionate explorer in number-theory, number-series and devised several innovative approaches to solve numerical problems. Although his original work was noted by few passionate minds yet, it did receive wider attention from the society and the government. He was author of so many mathematical research papers in conferences and journal papers. His work went unnoticed.

I had a privilege to accompany him for many years as his student, as a co-traveler to several mathematical work-shops and conferences. I had innumerable discussions with him.

We are going to see some of his numbers.

1. Kaparekar constant 495 & 6174
2. Self numbers.
3. Harshad numbers
4. Dattatray numbers
5. Monkey numbers



LANCZOS POTENTIAL – AN ANALOGY BETWEEN ELECTROMAGNETISM AND GRAVITATY

I 15

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Abstract

In classical theory, electromagnetic forces and gravitational forces are expressed with the help of inverse square law. Also in both cases the forces can be derived from potentials. In relativity electromagnetic forces are presented by a tensor of second rank and also this tensor can be derived from a potential vector. In relativity, gravity is no more a force and it is attributed to the curvature of the space-time described by a fourth rank tensor. It is possible to generate the curvature tensor from a tensor of rank three, called Lanczos tensor.

In this lecture is aimed at discussing this potential formalism.



FUZZY SOFT SET THEORY AND ITS APPLICATION IN DIMENSION REDUCTION AND MEDICAL DIAGNOSIS

I 16

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Abstract

In our daily life, we often come across various problems related to the high dimensionality of data. In such type of problems irrelevant and superfluous data along with useful data is also present. Thus, dimensionality reduction has found wide applications in data analysis and management. In recent years the issue of dimensionality reduction in a fuzzy situation has also gained importance and has invited attention of researchers. The various techniques and theories have been developed by them to solve these types of problems. Some of these techniques based on probabilistic approach and others are non-probabilistic approach.

For finding coherent and logical solution to various real life problems containing uncertainty, impreciseness and vagueness, fuzzy soft set theory is gaining significance. In the proposed talk the concept of fuzzy soft set has been defined as hybridization of fuzzy set and soft set theory. A new technique is proposed to convert the soft set table into fuzzy soft set table and has been applied in dimension reduction of big data. An application of fuzzy soft sets has also studied in Medical Diagnosis by following Sanchez's approach.

Keywords: Soft set, fuzzy set, fuzzy soft set, dimensionality reduction, medical diagnosis.



DATA SCIENCE AND SOFT COMPUTING : (DECISION MAKING USING FUZZY LOGIC IN MEDICAL FIELD)

I 17

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Abstract

The use of advance computing technologies, business applications require a huge amount of data to be processed. The data has been collected from various sources and is heterogeneous in nature. To convert data in to information for decision making, data analysis is required. Apart from Statistics, Soft Computing(SC) techniques (Fuzzy Logic, Artificial Neural Networks and Genetic Algorithms) have been proved to be effective to analyse huge data. SC mimics the ability of human mind. Fuzzy Logic deals with approximate reasoning tolerant to imprecise and uncertain problems with partial truth. Artificial Neural Networks are information processing systems and works like the processing of the brain as a basis to develop algorithms that can be used to model complex patterns and prediction problems. Moreover, they have ability to learn from mistakes. While Genetic Algorithms imitate the power of evolution with code, along with natural selection, in order to solve problems better and faster. Here population consists of a collection of solutions to a specific problem.

Here, in medical field, diabetic patients' data has been analysed for detection of correct dose of insulin using fuzzy logic, in effective manner.



ON THE TERM VIPULATVA FOUND IN THE MAHĀBHĀRATA

I 18

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Abstract

The Mahābhārata, one of the two major epics of ancient India, refers to the data for C, d, and t of each of the Svarbhānu, the Moon and the Sun where is C circumference (pariṇāha), d is diameter (viškambha), and nothing is clear about t. So far has not been interpreted by any modern scholar. The terms used for t in the Mahābhārata are vipulatā, vipulatva, and viškambha, each of which means is largeness, extent, or width. This paper is aimed at igniting the process of interpreting. It shows that t cannot be interpreted in the manner in which the body of the Svarbhānu, the Moon or the Sun be proved to be cylinder or ellipsoid or spherical segment or oblate spheroid or disk. t is not the curvilinear distance between the outermost orbit and the innermost orbit of the Svarbhānu, the Moon or the Sun. That t is a range of extent to d is not acceptable as the ratio between d and t is not the same for the given data of each of the Svarbhānu, the Moon and the Sun.

Keywords: Mahābhārata, vipulatva

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Abstract

The concept of śūnya in India has a long History in various dimension in Mathematics and Philosophy. Zero is the embodiment of Pūrṇa, lopa, Ākāśa, Bindu (Dot) or Śūnya (Circle) in Indian Literary and cultural tradition. We confined ourselves to zero as place value numeration or computational number. Historians are of the opinion that zero is the invention of India but who invented, it is not clear. Similarly the period of invention is also not known.

George Ifrah is of the opinion that zero is used first time in Lokavibhāga of Sarvanandi (458 A.D.). I would like to mention that Lokavibhāga is a Jaina Prākṛta Text. Presently it is available in its saṃskṛta translation of Simhsuri (11th C.A.D.) with certain changes. I have examined other Jaina Texts of 1-9th C.A.D. also

1. Ṣaṭakhaṇḍāgana of Dharasena (1st C.A.D.)
2. Anuyogadvāra Sūtra of Āryarakṣita (2nd C.A.D.)
3. Tiloyapaṇṇattī of Yativṛaṣabha (176 A.D.)
4. Bhagavati Sutra (1-5th C.A.D.)
5. Āvaśyaka Nirukti of Bhadrabāhu (816 A.D.)
6. Bṛhat Kṣetra Samāsa of Jinabhadragani (609 A.D.)
7. Dhavalā of Virasena (816 A.D.) etc. All these have frequent use of zero.

Bakṣālī Manuscript (224-383 A.D.) also have clear use of the zero. It may be a part of any unknown Jaina Mathematical text which is missing at present. Now a days it is not sure.

Evidences of all these texts with the use of zero will be discussed in the present paper.



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Abstract

The Dhavalā Tīkā of Ācārya Vīrasena is a commentary on Ṣaṭakhaṇḍāgama (1c. A.D.) of Puṣpadanta and Bhutabali written in 816 A.D. It is a text of first rate importance and treated as Āgama in Jaina community, especially in Digambara sect comprised of 72,000 slokas (gāthās) in Prakrit Language.

There exist concepts and illustrations of set theory where the word Rāsi is used for sets. The concept of finite set, infinite set, null set, singleton set, subset, super set etc. are available in detail. The notions of logarithm developed by John Napier in 1614 but it is available in Dhavalā in 816 A.D., under the name arddhaccheda. Not only the basic formulae of Logarithms but the concepts of log log and log loglog are also available in Dhavalā commentary. However, it is true that all the rules are discussed in Dhavalā with base 2, 3, 4 and 5 but in the modern mathematics base 10 and e are used. There are eleven types of infinities mentioned in Dhavalā. In addition to the fundamentals of Mathematics, the traces of advance mathematics like Quantum theory and Probability etc. are available in Dhavalā. In a nut shell, the commentary of Ṣaṭakhaṇḍāgama i.e. Dhavalā Tīkā of Vīrasena has a unique way of explaining the mathematical concepts which is quite interesting and valuable.

Keywords: Indian Mathematics, Jain Mathematics, Dhavalā Tīkā, Ācārya Vīrasena.



USE OF KUTTAKA METHOD IN RSA CRYPTOGRAPHY

I 22

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Abstract

Kuttaka method has been explained by Ancient Indian Mathematicians such as Aryabhata (476–550 CE), Bhaskaracharya I (c. 600 – c. 680) and Bhaskaracharya II (1114–1185). It deals with finding x (called kuttaka) such that given integers a and b , $ax+b$ is divisible by n . Taking $b=-1$, x gives, in modern language, the inverse of a modulo n . Kuttaka method may be considered as starting point of modular arithmetic. In the talk we will explain Kuttaka method and will see how it is used in RSA Cryptography.



BRAHMAGUPTA'S APODICTIC DISCOURSE

I 23

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Abstract

We continue our analysis of Brahmagupta's *Brāhmasphuṭasiddhānta* (India, 628), that had shown that each of his sequences of propositions should be read as an *apodictic discourse*: a connected discourse that develops the natural consequences of explicitly stated assumptions, within a particular conceptual framework. As a consequence, Brahmagupta did provide a derivation of his results on the cyclic quadrilateral. We report in this talk on the analysis of further problematic passages in Brahmagupta's *magnum opus*, regarding number theory and algebra. They make no sense as sets of rules. They become clear as soon as one reads them as an apodictic discourse, so carefully composed that it leaves little room for interpretation. A similar approach is also relevant to the analysis of Baudhāyana's *Śulvasūtra*, as well as texts from other cultures.



REVERSIBLE ELEMENTS IN CLASSICAL GEOMETRIES

I 24

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Abstract

Reversible elements are those elements in a group which are conjugate to their own inverses. Reversible elements appear naturally at different branches of mathematics. For instance in the pendulum n -body problem in classical mechanics or theory of billiards. Reversibility has its origin in the classical work of continuous dynamical system as well. These elements are also known as 'real' elements to group theorists. The term 'real' is motivated by a classical theorem of Frobenius and Schur (1906) that says that If G is finite then the number of real-valued complex irreducible characters of G is equal to the number of conjugacy classes of reversible elements. It is an ongoing theme of research to classify reversible elements in groups. These elements are closely related to the elements in a group which are products of two order two elements. Reversible elements also appear naturally in classical Euclidean geometry. Recently some works have attempted to classify such elements in the non-Euclidean geometries as well. In this talk we shall give a survey of reversible elements in classical and non-Euclidean geometries.



CONCEPTUAL UNDERSTANDING OF QUADRILATERALS AND TRIANGLES VIA CONSTRUCTIONS IN ŚULBASŪTRAS - A PEDAGOGICAL TOOL

I 25

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Abstract

There is a long history of teaching and learning Mathematics in India. Quite a few topics in mathematics at secondary school level have roots in old Sanskrit texts in India. For example, plane figures such as rectangle, square, trapezium and isosceles triangle prescribed for the standards 7 to 10, SSCE, CBSE and ICSE boards have been discussed in Śulbasūtras composed in 800 BCE - 200 BCE. So this topic has historical significance in mathematics education in India. Although the properties are similar, the treatment given to these plane figures in Śulbasūtras and that in the modern texts is different. It is true that the properties of quadrilaterals and triangles can be learnt by exploring ideas of symmetry and transformation. Activities like transforming one geometrical figure into another are discussed in detail in Śulbasūtras. The aim of the paper is to examine whether teaching the properties of quadrilaterals and triangles via Śulbasūtras is useful as a pedagogical tool in modern classrooms to enhance the conceptual understanding of the students.



CALCULAS, ARCHIMEDES TO NEWTON AND BEYOND

I 26

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Abstract

This talk briefly describes how the concept of calculus developed, more or less, continuously through last more than 2500 years with important landmarks in each period; before, during and after Newton and Leibnitz.



ELLIPTIC CURVES AND ITS APPLICATIONS IN CRYPTOGRAPHY

I 27

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Abstract

An elliptic curve is a curve with a natural group structure, i.e., a curve whose points form a group. Elliptic curves appear in many diverse areas of mathematics like number theory, algebraic geometry, complex analysis, cryptography, mathematical physics, etc. The aim of this talk is to give a quick introduction of elliptic curves and to emphasize on its application in cryptography. The talk begins about the motivation for the group law established geometrically on the elliptic curve. The elliptic curve is then formally defined along with a few examples, its history, related results, and recent advancement in the field. The talk concludes with some application(s) of elliptic curves in cryptography which brings the branch of Elliptic Curve Cryptography at the exposure.

A basic knowledge of number theory, algebra, and geometry would be preferable and assumed. The talk is elementary in nature and aimed at a wide range of audience.

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Abstract

This talk originates from the investigation of nonlinear functional-integral equation with Erd lyi-Kober fractional operator. Existence results of solutions in Banach algebra are obtained under some relevant results of fixed point theorems such as Darbo's theorem concerning the mentioned goal in Banach algebra. Finally, some examples to illustrate the usefulness of our results. Variational inequality theory contains a wealth of new ideas and techniques. Variational inequality theory, which was introduced and considered in early sixties, can be viewed as a natural extension and generalization of the variational principles. It is amazing that a wide class of unrelated problems, which arise in various different branches of pure and applied sciences, can be studied in the general and unified framework of variational inequalities.

Keywords : Dynamical system, iterative method, Sequence spaces; Erd lyi-Kober fractional integrals; functional-integral equation; compact operators, fixed point theorem; Banach algebra; measures of non-compactness.

**SOME GENERALIZATION APPROXIMATION THEORY
FOR STANCU TYPE INTEGRAL OPERATORS****Vishnu Narayan Mishra**

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Abstract

The goal of this talk is to attract researchers as well as scientists who are working in the recent advances in operator methods in approximation theory and related applications. Potential topics of this talk include but are not limited to the following: Approximation by positive operators, Approximation by linear/nonlinear operators, Approximation by integral operators, rate of convergence and moduli of smoothness.

Keywords: Matrix operator, Regular matrix, Summation integral type of operators etc 2000 Math Sub Class: 41A25, 41A35.



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Abstract

Though India in Antiquity is generally well-known among common educated folks for its lofty philosophical ideas and thoughts, its unique mathematical achievements have not come to the limelight with equal importance and glory, possibly but for one instance: transformation of the philosophical idea of SUNYA into the invention of mathematical ZERO as a number in its own right in tandem with the decimal place-value notation, which is recognized nowadays worldwide as a cornerstone of human civilization, peerless among the advancement of knowledge as a whole. However, this unique accolade has somewhat eclipsed many a praiseworthy and deep mathematical idea that evolved and flourished in India during ancient time, most of which now go by the names of one European mathematician or the other from decidedly later period of time. This happened mostly due to our general ignorance that crept in through either colonial bias of some early British historians of this period, or political/ideological compulsion of upholding the “Greek supremacy” by some relatively modern “Eurocentric” historians/scholars, which can be traced in the historiography of ancient India. On the other hand, recent times have witnessed a few tall claims about ancient Indian scientific achievements, mostly made from non-academic quarters, without much of proper scientific, analytic or historical back-up, which tends to put any sceptic mind in the denial mode about any and every achievement as a whole. However, not an iota of braggadocio is needed to appreciate the mathematical achievements of ancient India, if we objectively look at the long list of unparalleled feats attained. To mention only a few, these include results of plane Geometric constructions to be found in Sulba Sutra, based on the enunciation of the so called “Pythagorean theorem”, much ahead of its Greek “origin”, a lineage of combinatorial marvels starting from Pingalachandasutra of second century B.C., leading to results, now commonly known as “Pascal’s triangle” or “binary numbers”, about two thousand years ahead of their rediscovery in Europe by Pascal and Leibniz respectively, to the works of Virahanka in 600 C.E. which is now referred to as Fibonacci numbers, Arithmetical gems in the Bakshali manuscript akin to Newton’s later work, solutions of indeterminate equations--- Kuttaka algorithm of Aryabhata, the algebraic principle of Bhavana by Brahmagupta (one of whose brilliant work is erroneously referred to as Pell’s equation), which was furthered by Bhaskara II and Jayadeva in Chakravala algorithm, the series expansions of trigonometric functions achieved by the Kerala school of Madhava and his disciples some two hundred years before inception of calculus in the West, etc.

In this lecture, designed to fit an extremely limited timeslot, we shall try to throw some light on a few of these achievements in a nutshell manner.



ANALYSIS OF MULTILEVEL INVERTERS FOR INDUCTION MOTOR USING MATLAB SOFTWARE

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Abstract

This paper presents the significance of Mathematics in simulation of multilevel inverter fed induction motor drive. The output harmonic content is reduced by using multilevel inverter. In symmetrical circuit, the voltage and power increase with the increase in the number of levels of inverter. The switching angle for the pulse is selected in such way to reduce the harmonic distortion. This drive system has advantages like reduced total harmonic distortion and higher torque.



AN OVERVIEW OF VĀKYAKARAṆA OF PARAMEŚAVARA

I 33

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Abstract

Vaṭaśṣeri Parameśvaran Nambūdiri popularly known as Parameśavara (1380–1460) was a Mathematical astronomer of the Kerala school of astronomy and mathematics founded by Mādhava of Saṅgamagrāma. He has authored several works including *Ḍṛggaṇita* which is composed by revising the parameters based on observations. The text *vākyakaraṇa* of Parameśvara is unique in the sense that it gives algorithm for constructing the *vākyas*. It is mentioned in the second half of the first verse of text that

“करोतिवाक्यकरणंवाक्यावयवसिद्धये”

The text *vākyakaraṇa* is composed for obtaining the *vākyas*.

The text *vākyakaraṇa* contains sixty-six verses and give algorithm for obtaining the *vākyas* such as “*gīrmaśreyādi-vākyas*”, “*saṅkrānti-vākyas*” and so on. In the talk having given an overview of the text, we would proceed to explain some of the algorithm for obtaining the *vākyas*. We have used the paper manuscript (mss. KVS 242) for our study. This manuscript is collected from Prof. K V Sarma Research Foundation where it is preserved. Prof. Sarma transcribed this from the manuscript (mss. Triv. C. 133 A.) which is preserved in Travancore University manuscripts Library, Trivandrum.



FOLIATIONS IN GEOGRAPHY

I 34

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Abstract

Foliation theory is usually considered as a twentieth-century invention, namely, by Charles Ehresmann and Georges Reeb; some authors consider it was born slightly before, in the work of Paul Painlevé. In fact, foliations appear as an important tool in the art of map drawing, and they were used by mathematicians since antiquity. In this talk, I will discuss the use and the importance of foliations in geography and map drawing. I will mention works of Ptolemy, Euler, Lagrange, Chebyshev and others.



AN INTRODUCTION TO MATHEMATICAL IMAGE PROCESSING & ITS APPLICATIONS

I 35

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Abstract

Image processing is an essential field in many applications, including medical imaging, astronomy, astrophysics, surveillance, video, image compression and transmission etc. In one dimension, images are called signals. In two dimensions we work with planar images, while in three dimensions we have volumetric images (such as MR images).

These can be gray-scale images (single-valued functions), or color images (vector-valued functions). There are three types of processing: 1. Low level: Also known as image enhancement or preprocessing. 2 Mid-Level processing: It involves tasks such as segmentation and feature extraction. 3. Recognition of individual objects.

Noise, blur and other types of imperfections often degrade acquired images. Thus such images have to be first pre-processed before any further analysis and feature extraction. Mathematical operations such as Log transformation, Power law transformation, Linear contrast stretching and Histogram is used to improve the quality of images also known as image enhancement. Quality of images are also improved by applying filtering in the spatial domain (using first- and second order partial derivatives, the gradient, Laplacian, and their discrete approximations by finite differences, averaging filters, order statistics filters, convolution), and in the frequency domain (the Fourier transform, low-pass and high-pass filters). In Mid-level processing Mathematical Morphological operations such as erosion, dilation, opening and closing are used for extracting image components that are useful in the representation and description of region shape like boundaries, skeletons and convex hull.

Application like automated analysis of text involves acquiring an image of the area containing text, Preprocessing, Extracting (segmenting) the individual characters, Describing the characters in a form suitable for computer processing and Recognizing those individual characters.



FACTORIAL FUNCTIONS AND ITS GENERALIZATION BY PROF. MANJUL BHARGAVA

I 36

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Abstract

This lecture is based on Field medalist and a Professor of Mathematics at Princeton University, Manjul Bhargava's paper on the same subject which appeared in American Mathematical monthly in 2000. The reason for selecting such a topic is to illustrate how an insight into the factorial function which is known to an undergraduate student of Mathematics can lead to a more serious and complex mathematics.

We will discuss the factorial function and its impact on number theory. Make an attempt to explain how this function has been generalized by Professor Bhargava, study some of its properties.



SOME RESULTS ON CONVERGENCE OF SEQUENCES AND SERIES IN SANSKRIT MATHEMATICS

I 37

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Abstract

Ancient Greece is well known for its seminal contributions to the study of infinite series in the work of Archimedes and for its distrust of the subject as a source of "paradox" in the philosophy of Zeno. Here we examine a different set of approaches to the notion of a convergent sequence or series emerging in Indian exact sciences in the first millennium CE. This talk will explore sources from early medieval mathematical astronomy up through the infinite series of the second millennium Kerala school and some later developments.



ROLE OF ECM STIFFNESS AND ENERGY IN THE GROWTH OF CANCER IN HUMANS

I 38

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Abstract

Extracellular matrix (ECM) is considered essential for wound healing processes, but excessive matrix deposition can result in organ dysfunction, as has been observed with fibrotic disease. ECM stiffness has been shown to play critical role in encouraging a tumor micro environment and increased stiffness being a main feature associated with tumor development. The growth of cancer through mechanical/chemical/electrical and biological properties in discussed. A mathematical model is developed in which use of energy is made to link the mass of the stiff tissues with the aggression velocity for the growth of cancer in humans. Implicit solution of the modeled differential equation is derived. It is shown analytically that product of model parameters: initial infection growth proportion, time for highest cancer growth rate, the growth parameter and level off value turns out to be constant. The control and possible treatment strategies are also obtained analytically through the time of highest growth rate, maximum estimated cancer growth proportion and level off value.

Keywords: Tissue density, kinetic and potential energy, cancer growth.



SOME USEFUL SPECIAL FUNCTIONS OF TECHNOLOGY AND ENGINEERING

I 40

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Abstract

This lecture mainly useful for the students and researcher of Technology and Engineering. Some useful special functions in particular Error function, complementary error function their development and fundamental properties will discuss in this lecture. Moreover, concept of Hypergeometric functions, Factorial functions also deliberate.

WHAT MAKES US TEMPTED TO INCORPORATE HISTORY WHILE TEACHING

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Abstract

The history of mathematics is nearly as old as humanity itself. Mathematics has been fundamental to advances in science, engineering, and philosophy. Why should the history of mathematics have a place in teaching? Fauvel (1991) has listed fifteen reasons for including the history of mathematics while teaching includes cognitive, affective, and socio-cultural aspects. Employing the history of mathematics while teaching can potentially meet the objectives of increasing the student's motivation and develop a positive attitude towards the subject. Historical problems can help develop student's mathematical thinking. By using the brief sketch of lives of mathematicians as platform, teacher can inculcate the humanistic aspects of mathematical knowledge. In fact, the history of mathematics can contribute to both subject matter knowledge and pedagogical content knowledge. This talk will provide some examples from the history of teacher incorporate while teaching then students will definitely be appreciating the subject with great vigour.

भास्कराचार्यरचित लीलावतीग्रन्थ का गणितशास्त्र में योगदान

डॉ. चन्द्रकान्त

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संक्षिप्तिका / Abstract

भास्कर का अर्थ होता है — सूर्य।

भारतीय ज्योतिष और गणित के आकाश में भास्कराचार्य की मौलिक और गवेषणात्मक प्रतिभा दोपहर के प्रखर सूर्य की तरह दैदिप्यमान है। वे भारतीय गणितज्ञों में सर्व श्रेष्ठ हैं। स्वरचित सिद्धान्त शिरोमणि में भास्कराचार्य ने स्व परिचय के रूप में निम्न पद्य संकेतित किया है—

रसगुण पूर्ण मही सम शकनृप समयेऽभ्वन्ममोत्पत्तिः ।

रसगुण वर्षेणमया सिद्धान्त शिरोमणि रचितः ।

अर्थात् “अंकानां वामतो गतिः” के अनुसार शक संवत् 1036 में मेरा जन्म हुआ एवं 36 वर्ष की आयु में मैंने सिद्धान्त शिरोमणि की रचना की। इस प्रकार 1036 + 78 = 1114 ई. में भास्कराचार्य का जन्म एवं 1150 ई. में सिद्धान्त शिरोमणि की रचना की। भास्कराचार्य के लिखे गये दो ग्रन्थ प्रायः उपलब्ध होते हैं— सिद्धान्त शिरोमणि एवं करण कुतूहल। सिद्धान्त शिरोमणि गणित और ज्योतिष का ग्रन्थ है। इसके चार विभाग हैं— लीलावती, बीजगणित, गोलाध्याय और ग्रहगणित। करण कुतूहल में पंचांग बनाने की विधियाँ वर्णित हैं।

लीलावती ग्रन्थ भास्कराचार्य की सार्वकालिक लोकप्रिय रचना है। ज्योतिष के अध्ययन के लिये गणितीय ज्ञान लीलावती में दिया गया है। इसका मुख्य विषय अंक गणित है, किन्तु इसमें ज्यामिति, त्रिकोणमिति एवं बीजगणित की भी चर्चा निहित है। लीलावती में दशगुणोत्तर प्रणाली से अंक एवं त्रैशिक, पंचराशिक, मिश्र, श्रेढी, कुट्टकादि से सम्बन्धित गणित सम्मिलित हैं। प्रस्तुत शोधपत्र में लीलावती में वर्णित अंक गणित के विभिन्न अंशों पर विशेष रूप से अवधान दिया जायेगा।

अवधेयांश (Key Words) : लघुत्तम एवं महत्तम समापवर्तक (L.C.M. & H.C.F.), वर्ग मूल एवं घन मूल (Square & Cube Root), शून्य एवं दशम लवांक प्रणाली (Zero & Decimal System), त्रैशिक विधि (Inverse Pro-portion), साधारण एवं चक्रवृद्धि ब्याज (Simple & Compound Interest), संकलितैक्य सूत्र (Progressions [Series]), क्षेत्रमिति (Mensuration), छाया ज्ञान (Shadow) इत्यादि।



APPLICATION OF COMPUTATIONAL MODELS OF ARTIFICIAL INTELLIGENCE

I 44

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Abstract

In computer science, artificial intelligence (AI) /Machine intelligence, is intelligence demonstrated by machines based on computing power which is derived from mathematical models.

The traditional problems (or goals) of AI research include reasoning, knowledge representation, planning, learning, natural language processing, perception and the ability to move and manipulate objects. General intelligence is among the field's long-term goals. Approaches include statistical methods, computational intelligence, and traditional symbolic AI. Many tools are used in AI, including versions of search and mathematical optimization, artificial neural networks, and methods based on statistics, probability and economics. The AI field draws upon computer science, information engineering, mathematics, psychology, linguistics, philosophy, and many other fields.

In the twenty-first century, AI techniques have experienced a resurgence following concurrent advances in computer power, large amounts of data, and theoretical understanding; and AI techniques have become an essential part of the technology industry, helping to solve many challenging problems in computer science, software engineering and operations research.

Types Of Problems Solved Using Artificial Intelligence Algorithms

Algorithms in each category, in essence, perform the same task of predicting outputs given unknown inputs, however, here data is the key driver when it comes to picking the right algorithm. What follows is an outline of categories of Machine Learning problems with a brief overview of the same: Classification, Regression, Clustering



APPROXIMATE ANALYTICAL METHOD AND ITS APPLICATION

I 46

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Abstract

Over here, the presented view is devoted to an analytic approach, namely the homotopy analysis method Liao [3]. Validity of the homotopy analysis method is independent on whether or not there exist small parameters in nonlinear equations, so it gives powerful analytic tool to strongly nonlinear problems. Appropriate nonlinear problems have been illustrated as examples to show the great potential of the method.



THE FIRST TEXTBOOKS ON THE THEORY OF FUNCTIONS

I 47

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Abstract

The idea of a function was conceived in algebra and early analysis. However, this notion was finally formed in the early 19th century. The notion of a continuous function was formed in the 19th century. We will review the process of separation of the course of the function theory from the course of differential and integral calculus.

Keywords : the history of the function theory, continuity, E. H. Heine, K. Weierstrass, U. Dini.



ŚULVASŪTRAS - INSPIRED RATIONAL APPROXIMATIONS TO INTEGERS

I 48

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Abstract

In some Sulvasutras, the following approximation for $\sqrt{2}$ is stated:

$$\sqrt{2} = 1 + \frac{1}{3} + \frac{1}{3.4} - \frac{1}{3.4.34} = \frac{577}{408}$$

Some scholars have suggested a geometrical construction to arrive at this result. This approach for finding $\sqrt{2}$ is also related to the solution of the *Vargaprkti* equation (quadratic indeterminate equation) : $x^2 - 2y^2 = 1$, for which $x = 577$, $y = 408$ is a solution. Similarly, a geometrical construction has been suggested for the following approximation for $\sqrt{3}$ by B. B. Datta :

$$\sqrt{3} = 1 + \frac{2}{3} + \frac{1}{3.5} - \frac{1}{3.5.52} = \frac{x}{y} = \frac{1351}{780}$$

which is also related to the solution of the equation $x^2 - 3y^2 = 1$, for which $x = 577$, $y = 408$ is a solution. In our presentation, we give the explicit geometrical approach to find the rational approximation to $\sqrt{5}$, $\sqrt{7}$ etc., and the relation of the approximation to the solution of $x^2 - Dy^2 = 1$, for $D = 5, 7$, etc. It is hoped that this approach would be of pedagogical interest. This could be of interest for instruction in mathematics at the higher secondary level (say, +2 level).



THE AMAZING APPLICATION OF MATRIX CALCULUS IN COMPUTER VISION IN ARTIFICIAL INTELLIGENCE

I 50

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Abstract

This paper addresses a quick and short understanding of matrix calculus used in convolution neural network. The matrix calculus is the core mathematics behind concept of training any neural network in computer vision. The matrix calculus looks simple in understanding but its derivatives play an important role in convolution neural network which

in turn used during training by optimizing loss functions. The perceptron is a single analogue unit to neuron in human brain. To fire or to activate a single neuron in a neural network is calculated using linear algebra based on dot product. In simple terms, the activation of a single computation unit in a neural network is typically calculated using the dot product of a vector w with a vector x , where w is the edge weight vector and x is the input vector which is then added to a scalar bias or threshold b . This function is also known as affine or connected function which in turn later used by a rectifier function, which is popularly known as activation function to remove the negative values and this is all about the real concept of 'artificial neuron' or 'perceptron' in computer vision's deep learning methods for object identification or recognition. The paper describes matrix calculus methods to understand what is happening inside a convolution neural network in detail.



SOME UNLIKELY BUT AMAZING MEN OF MATHEMATICS I HAVE MET

I 51

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Abstract

It is known that India produced brilliant Mathematicians long before the arrival of British. In pre-British era, Indian Mathematicians were profound and learned and almost exclusively from the upper castes. The British put in place a system of education in which any person (irrespective of caste and creed) could get educated and aspire to be a Scientist, Doctor, Engineer etc. I wish to point out a consequence of it on the nature of Mathematicians in India. An impact of the system of education introduced by the British and its continuance after independence by our Leaders was that the education descended down the economic and caste hierarchies. After about 1940 or so we observe that we had a class of people who had good secondary education, were talented in Mathematics but were not very familiar with higher Mathematics. Some of these indulged in "research" in the realm of numbers. In this lecture, we intend to talk about the work of some of these people. Such researchers are not often given their due. It is high time we recognise the contributions of such "unlikely" Mathematicians as creators of important and interesting results in Mathematics.



GUJARAT GANIT MANDAL

I 52

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Abstract

This is the story of a regional mathematical society founded by renowned mathematician Prof. P.C.Vaidya. The society, now more than fifty years old, has played a pivotal role in bringing the school, college and university teachers on the same platform, with the common objective of discussing mathematics and problems of mathematics education.



ON DEVELOPMENT OF RELATIVITY FROM 1900 TO 1920

I 53

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Abstract

The history of the theory of relativity is closely related to the physics the theory tries to explain. I, from a viewpoint of a practicing differential geometer, would like to give a concise description of how the Newtonian mechanics, the Maxwell equation, and lastly the gravitational force have been formulated mathematically. If time permits, I would like to refer to the recent detection of gravitational waves as well as the "photograph" of a blackhole.



SPHERICAL GEOMETRY IN THE SAINT-PETERSBURG ACADEMY OF SCIENCES

I 54

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Abstract

In the second half of XVIIIth -- beginning of the XIXth century, Euler with his colleagues, students and successors formed the first mathematical school in the Saint-Petersburg Academy of Sciences. They made contributions in various fields of mathematics. One of their main achievements was the development of the geometry of the sphere. In my talk I will discuss some of their results in spherical geometry and trigonometry and their place in pure and applied mathematics.



PRESENTATION OF ONE NEW METHOD OF MULTI-CRITERIA ANALYSIS FOR EVALUATION AND DECISION MAKING BY DOMINANT CRITERION

I 55

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Abstract

We will present a new method for multi-criteria analysis where the failure to meet the dominant criterion of an alternative causes low values for the entire alternative. Criterion C_j is dominant for solving multi-criteria problems if the value of alternatives according to this criterion is extremely low, then there is no solution for that problem, or the solution obtained has an extremely small (weak) importance.



HISTORICAL DEVELOPMENT OF FERMAT NUMBERS AND CONTRIBUTION OF NEMICHANDRA

I 56

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Abstract

Nemichandra Siddhāntachakravartī was a great Jaina scholar of Sravanabelgola Karnataka. Nemichandra Siddhāntachakravartī wrote four canons namely (I) the Gommaṭasāra Jīvakāṇḍa Siddhāntachakravartī in Prakṛt (734 verses) (ii) the Gommaṭasāra Karmakāṇḍa in Prakṛt (972 verses) (iii) the Labdhisāra (with the Kṣapaṇāsāra) in Prakṛt (649 verses) (iv) the Trilokasāra in Prakṛt (1018 verses). The Tiloyasāra (Trilokasāra in Sanskrit TLS) of Nemichandra Siddhāntachakravartī (981 A.D.) is the celebrated work in Prakṛt on Karaṇanuyoga.

Nemichandra Siddhāntachakravartī has discussed in detail about fourteen types of sequences given in TLS. There also exists the non square sequence (ākṛtidhārā) as 2, 3, 5, 6, 7, 8, 10, 11, 12, ---- and dyadic square sequence like 2^{2^1} , 2^{2^2} , 2^{2^3} , ----, 2^{2^n} . Then the general term of this series is 2^{2^n} , which is also used to define the Fermat's numbers, $F_n = 2^{2^n} + 1$, but Fermat (1640 A.D.) conjectured that all numbers of the form $F_n = 2^{2^n} + 1$, $n = 0, 1, 2, 3, ----$ was prime for every nonnegative integer n . This is true for n up to 4 but false for $n = 5$ as Euler verified later. It is remarkable here that Nemichandra Siddhāntachakravartī knew about Fermat numbers many Century before Fermat so it should be renamed as Nemichandra–Fermat Numbers.

The ancient priests in Uruk and Sheepfold (2500 B.C.) are known to have inscribed long lists of prime numbers in cuneiform. Both the ancient Greeks and the ancient Chinese independently developed primality test. One of the most famous and simplest primality test was developed by the Greek Mathematician, Sieve of Eratosthenes, in 200 B.C., one millennium later than the Chinese method. Nemichandra - Fermat numbers are useful for test of divisibility and compositeness, numerous recurrence relations, connections with Geometry and Galois Theory of Abstract Algebra, and Modern day applications to Computer Science and Technology.



A GLIMPSE AT THE GANITAKAUMUDI OF NARAYANA PANDITA

I 57

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SECTION - B
HISTORICAL PERSPECTIVES

P. B. Acharya

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Abstract

“Learning by doing” is very effective methodology in teaching learning process. We know that the teaching and learning of mathematics is a complex activity and many factors determine the success of this activity. Innovations in teaching of mathematics can be diversified in terms of methods, pedagogic resources and mastery learning used in teaching-learning process.

In this paper, we discuss the efforts, made for innovations and innovative practices in teaching mathematics, under different teaching methods, strategies and pedagogic resources to make a joyful learning.

Key Words: Teaching-learning process, Methodology, Innovation

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Abstract

The dynamic analysis of a mechanical system which is a rigid body with the geometry of a double cone. This double cone is apparently able to spontaneously roll uphill along inclined body. The experiment has been known for some centuries, and because of its extra ordinary behavior, it has been named 'mechanical paradox'. A deeper analysis of this mechanical object will allow us to go further than explaining the apparent paradox in the system; it will show interesting features of the dynamics. In this paper, we follow a complete study of the geometry, the kinematic variables and the Lagrangian dynamics of the problem for any set of the angular parameters and initial values, and obtain as a result a full description of the dynamic variables of this mechanical device. We study carefully what we call the constant potential geometry regime, where the centre of mass maintains its height, and found in this particular case some features of the dynamics which are not common in rolling objects.

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Abstract

In this paper various Vedic mathematics methods explained also its applications which are used for the various competitive examinations for any standard of student. This paper is about the ancient Vedic mathematics unique methods regarding multiplications, number system, quadratic equations also sub topics divisibility rules & simplification etc. In various competitive examinations this topics are included which consume much time then available time, given Vedic mathematics methods & its applications helps to solve problems in less time with accurately & effectively. In today's scenario every parents wants their children genius, clever & excellent towards the entire academic career. However they all while appearing in the competitive examinations, they get failure mostly in mathematics subjects that are logical subjects. This Vedic mathematics paper will give them hope & confidence that they can achieve their dreams by using Vedic mathematics in their examinations. Some of the applications of Vedic mathematics techniques are describe in this paper.



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Abstract

The concept of Laplace transformation plays a crucial role in solving various initial value problems. More than fifteen research papers, we have been studied about the different order Laplace transformation techniques.

In this paper, we discuss first, second and third order Laplace transformation with some basic properties of them. Also, we discuss the solution of partial differential equation by Laplace transformation.

Key Words: Laplace transformation, n-dimensional Laplace transformation, Partial differential equation.

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Abstract

This paper is aimed at the engineering and/or scientific professional who wishes to learn about Fractional Calculus and its possible applications in his/her field (s) of study. The intent is to first expose the reader to the concepts, applicable definitions, and execution of fractional calculus and second to show how these may be used to solve several modern problems. Also included within is a list of applicable references that may provide the reader with a library of information for the further study and use of fractional calculus.



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Abstract

Indian mathematics emerged within the Indian landmass from 1200 before Christ till the tip of the eighteenth century. Within the classical period of Indian mathematics (400 AD to 1200 AD), necessary contributions were created by the scholars like Aryabhata, Bramagupta, Bhaskara II and Ramanujan. The decimal numeration system in use these days was initial recorded in Indian mathematics. Indian mathematicians created early contributions to the study of the construct of zero as variety, negative numbers, arithmetic, and pure mathematics.

Additionally, trigonometry was more advanced in India, and specially, the trendy definitions of circular function and sine, cosine were developed there. These mathematical ideas were transmitted to the center East, China, and Europe and junction rectifier to more developments that currently type the foundations of the many areas of mathematics.

Many of the Vedic texts make clear regarding a number of the geometric constructions that were used throughout the Vedic Age. Besides the Vedic texts additionally the Sulbasutras also gave enough details regarding the geometric constructions those were used in the ancient age. Though throughout this era mathematic was largely used for resolution sensible issues however at a similar time there was a bit development within the field of pure mathematics.

Many of the developments of Indian mathematic stay virtually utterly unnoticed, or worse, attributed to scholars of other nationalities, usually European. But many historians (mainly European) square measure reluctant to acknowledge the contributions of Indian mathematicians. They believe Indians borrowed the information of mathematic from Greeks. During this article author has written the some Indian mathematicians transient history and their contributions.

IDENTIFYING THE FACTORS AFFECTING ON STUDENT'S ACADEMIC PERFORMANCE IN ENGINEERING MATHEMATICS

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Abstract

The study aimed to identify the factors affected on performance of under graduate students of engineering in mathematics. The information of this study is captured by means of a questionnaire. The respondents are teachers and students of 2nd year engineering. The result of mathematics in GTU examination for the academic year 2018-19 was consider to study the performance of students. The results revealed that the students who took the subject were not able to meet the required criteria. On the other hand, student's attitude towards mathematics, learning style, curriculum, teacher's training and parental support were the common factors that affect the performance of the students in Mathematics. The researchers recommended organizing periodic seminar and workshops for students, teachers and school administrators to promote positive attitude towards mathematics and to conduct effective tutorial sessions to improve student's performance.

Key Words: Student's Performance in mathematics, Positive Attitude, learning style, curriculum.



1729 : EK SAAT DO NAU

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Abstract

Two important concepts related to the number 1729 are presented in this paper. One of them is already a well-known story of Prof. Hardy and Ramanujan. Another relation of 1729 with mathematics is with Gamma function which is also presented in this paper. The history of both the concepts along with the development are discussed with a view of historical background. Some interesting properties for the concepts of Hardy-Ramanujan number and Gamma function are also presented.

Key Words: 1729, Ramanujan, Gamma function.

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Abstract

Though the number of students (or, in general, other stakeholders in the education process), who appreciate the efforts of a sincere teacher to improve his/her teaching is becoming very less due to various reasons, a good teacher should always try to find ways to do so. Different components of the examination process, as a whole, also affect the teaching learning process indirectly. It is needless to say that framing a good syllabus is also an art which affects the overall education process. Much has been already said by several authors in this regard. Keeping aside a jargon of these technical terms, in this paper, the author has tried to explore some of the mathematical concepts whose clear understanding will be beneficial to mathematics teachers, and hence to good students also. Some simple tricks to construct our own examples, of course, in specific topics, are also discussed. This will reduce the teachers' dependence on books. Further, it is discussed that, how software such as EXCEL and MATLAB may be used for solving some examples. This will help teachers to solve unsolved problems of some specific topics and may be useful to prepare solution of a question paper. Finally, author's views on what type of questions is appropriate for viva-voice examination are presented. To further clarify this point, a list of sample viva questions is given at the conclusion of the paper.



SECTION - C
RECENT TRENDS IN MATHEMATICS

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Abstract

Graph Theory is a branch of discrete mathematics. The field of Graph theory started its journey from the Konigsberg Bridge problem in 1735. Graph theory serves as a mathematical model to represent any system which has a binary relation. It has application to some areas like computer Engineering, Operation research, Physics, Chemistry, Biology and many other fields.

In this paper, we demonstrate various graphs with their definition, basic concept and some historical notes of graph theory. Also this paper gives an overview of the applications of graph theory in various fields like basic science, Technology, computer science etc. Various papers based on graph theory have been studied related to basic science, computer science etc. and an overview have been presented here.

Keywords : Bipartite Graph, Connected graph, Graph coloring, Euler Graph, Hamiltonian Path

**A GUMBEL MAX DISTRIBUTION MODEL FOR ENDORPHIN HORMONE SECRETION USING FUZZY APPROACH****Mallela Ankammarao**

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Abstract

In this paper a mathematical model for fuzzy mean, fuzzy variance values and its alpha cut sets using two parameter Gumbel max distribution were developed and used to study the Endorphin hormone secretion by multiple distinct cell populations. The result shows that the effect of an appropriate low level of calcium in blood increases the Endorphin hormone secretion.

Keywords: Mathematical models, Fuzzy set, Endorphin Hormone, Gumbel max distribution, Mean, variance.

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Abstract

In graph theory, different types of products of two graphs had been discussed, e.g., Cartesian product, Tensor product, Strong product, etc.. Graph product is a fundamental tool with rich applications in both graph theory and theoretical computer sciences. In this paper, first we discuss some properties of Cartesian product of graphs, which has been discussed by many researchers. Then we discuss some properties of generalized Cartesian product of Wheel family graphs like Star graph, Wheel graph and Helm graph..

Keywords : Cartesian product, Generalized Cartesian product, Degree of a vertex, Star graph, Wheel graph, Helm graph.

**RECURSIVE SUBSEQUENCE OF VARIOUS FIBONACCI-TYPE SEQUENCES****Khushbu J. Das**

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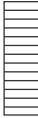
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Abstract

In this article, we describe special types of recursive subsequence of various well-known sequences like the sequences of Lucas numbers, generalized Fibonacci numbers, Pell numbers, Pell-Lucas numbers and Half-companion Pell numbers and we obtain their recurrence relation in each case.

Keywords : Fibonacci sequence, Lucas sequence, Pell sequence, generalized Fibonacci sequence. AMS Subject Classification number: 11B39, 11B83, 11B37.



ONSET OF DOUBLE DIFFUSIVE CONVECTION IN A MAXWELL FLUID SATURATED ANISOTROPIC POROUS LAYER WITH SORET EFFECT – AN ANALYTICAL STUDY

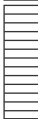
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Abstract

The onset of Darcy-Brinkman double diffusive convection in a Maxwell fluid-saturated anisotropic porous layer with solet effect is studied analytically using linear and nonlinear stability analysis. The modified Darcy-Brinkman Maxwell model is used for the momentum equation. The effect of the solet parameter, stress relaxation parameter, mechanical and thermal anisotropy parameters on the stationary and oscillatory convection is shown graphically. The transient behaviour of Nusselt and Sherwood numbers is obtained using numerical methods.

Keywords : Convection, Anisotropic, Porous layer, Soret Parameter, Diffusion.



FUZZY-VALUED CONTINUOUS FUNCTION WITH THE LEVEL SETS

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Abstract

In this paper, we construct the sets of bounded and continuous and uniform continuous fuzzy-valued functions with the level sets. We investigate the relationships between these sets and their classical forms and give some properties including definitions, propositions and various kind of fuzzy distance functions. Furthermore, we study some of their properties like completeness, uniform convergence.

EVALUATION OF TEACHERS PERFORMANCE IN ACADEMIC REVIEW COMMITTEE AT PARUL UNIVERSITY BY MUTLI-CRITERIA FUZZY DECISION-MAKING APPROACH

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Abstract

Evaluation of teachers in higher education is omnipresent for improving their standard, quality and performance. Application of fuzzy logic techniques in the field of education for evaluation is imperative. It is been used widely to evaluate student's academic performance as well as to assess the teacher's performance. Each educational organization have their own various tools and techniques to evaluate their teachers. This paper focuses on the unique evaluation tool used by Parul University i.e. Academic Review Committee report. We have used Mamdani inference system along with the MATLAB-2015a which has enable us to assess the criteria mentioned in the ARC form. There are 12 different inputs which are divided into three main academic measures, such as teacher's proficiency in Teaching & Subject Knowledge, their involvement in Co-curricular and Extension Service and their enthusiasm for professional development. Through this analysis, it will be possible to design special training program for the teachers in order to improve them in their respective field and according to their need.



A MATHEMATICAL MODEL FOR NUTRIENT VALUE OF GRAIN LEGUMES USING OCTOGONAL FUZZY NUMBER

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Abstract

This paper discusses the role of legumes regarding their nutrients which are used and required by human beings. The cost of legumes and the consumable parts of the legumes are considered and analyzed. Based on this, the levels of vitamins are tabulated in terms of octagonal fuzzy numbers. As a result the fuzzy transportation problem has been solved optimally for the vitamins provided by legumes with minimum cost.

Keywords: Fuzzy transportation problem, octagonal fuzzy number, Ranking function, vitamins, grain legumes

AMS Subject classification : 90B06, 90C08, 90C70, 90C90, 97A40, 97M40

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Abstract

Georg Cantor and Richard Dedekind originated set theory in 1870 which has become a fundamental theory in mathematics. Lofti Zadeh in 1965 proposed a completely new approach to vagueness called fuzzy set theory. A fuzzy set is a class of objects with continuum grades of membership. Such a set is characterized by membership (characteristic) function which assigns to each object a grade of membership ranging between zero and one. Rough set theory is yet another approach to vagueness introduced by Zdzislaw Pawlak in 1982. A rough set is a formal approximation of a crisp set in terms a pair of sets which give standard version the lower and upper approximation of the original set. Soft set theory is a generalization of fuzzy set theory proposed by Molodtsov in 1999 to deal with uncertainty in a parametric manner. A. R. Roy in 2007 studied on fuzzy-soft-sets in decision making problem. T. Beaula defined fuzzy soft metric space in terms of fuzzy soft open ball, fuzzy soft closed ball and fuzzy soft Hausdorff metric and further some equivalent conditions in a fuzzy soft metric space. The paper deals with the development of classical to non-classical set theoretical approaches, particularly the development of fuzzy soft metric spaces.



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Abstract

In this paper, we introduced a reproducing kernel space which is a particular class of Hilbert space. We discuss various properties of the reproducing kernel. In particular, our aim to construct kernel in reproducing kernel Hilbert space of the speci_c function space (Sobolev space) with the improved inner product and norm. Also, we derive the reproducing kernel for Neumann boundary conditions.

MAGNETIC FLUID BASED SQUEEZE FILM BETWEEN CURVED POROUS ANNULAR PLATES CONSIDERING ROTATION OF MAGNETIC PARTICLES AND SLIP VELOCITY

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Abstract

Based on the Shliomis ferrofluid flow model (SFFM) and continuity equation for the film as well as porous region, modified Reynolds equation for ferrofluid squeeze film between curved annular plates is derived by considering the effects of rotation of magnetic particles, slip velocity at the film and porous interface. The Darcy's law is assumed in the porous region. Using Reynolds equation, generalized form of non-dimensional pressure equation is derived and expression for dimensionless load-carrying capacity is obtained from it. Breversand Joseph's slip conditions adopted to study the effect of slip velocity. The graphical representation suggests that the performance of the bearing enhances due to magnetic fluid with considering the appropriate values of parameters for slip velocity and porosity.



PERIODICITY OF PELL SEQUENCE

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Abstract

In this paper, we study about the periodicity of Pell sequence $\{P_n\}$ defined by the recurrence relation $P_n = 2P_{n-1} + P_{n-2}$; for all $n \geq 2$; with $P_0 = 0$, $P_1 = 1$. We demonstrate that this sequence is always periodic and derive the number of fascinating results related with the periodicity of this sequence. We finally develop the formula for the length of the period of $\{P_n\}$ when considered under modulo integers 2^e , 5^e and 10^e ; $e \geq 1$.

Keywords: Fibonacci numbers, Pell numbers, Periodicity of sequence.

AMS Subject Classification (2010): 11B50, 11B39.

ANALYTIC SOLUTION OF IMBIBITION PHENOMENON ARISING IN HETEROGENEOUS POROUS MEDIA

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Abstract

In heterogeneous porous media geometry of pores are irregular while in homogeneous porous media the geometry of pores are uniformly same. The comparative study of counter-current imbibition phenomenon in heterogeneous and homogeneous porous medium has been also discussed. The governing partial differential equation obtained by mathematical formation of imbibition phenomenon has been solved by analytic method. The numerical as well as graphical interpretation of the solution have been given.

Keywords : imbibition phenomenon, heterogeneous porous media, oil recovery process.



EVOLUTION OF PURELY ELECTRIC AND PURELY MAGNETIC WEYL'S TENSOR IN A SPACETIME

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Abstract

The present paper is intended to study of evolution of purely electric and purely magnetic weyl's tensor in a spacetime; in particular to measure the electric and magnetic components of an observer with a time-like 4-unit vector we have attempted to describe the tensors, which are purely electric and purely magnetic weyl tensor with respect to the observer. Further, we have established that weyl tensor is purely electric and purely magnetic if eigen values of any matrix in spacetime is zero, real and imaginary. Afterward the cases from petrov types have been obtained therein.

Keywords: purely electric, purely magnetic, weyltensor, curvature tensor, Ricci tensor, petrov types, eigen values, space time.

SECTION - D
MATHEMATICAL APPLICATIONS



DESIGN AND OPTIMIZATION OF THE GATING SYSTEM THROUGH CONTINUITY EQUATION FOR SAND CASTING

T 01

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Abstract

Casting design involving gating and riser system design has a direct impact on the quality of cast components. The design should provide a minimum volume of gating and riser system but warranting the quality of the casting. Proper gating system helps in early prediction of solidifications results, thus reducing time, resource and man-power. Various mathematical calculations are helpful in the field of mechanical engineering and by applying continuity equation which ensures the optimality of the system. In proposed work gating system is carried out for Gas Control Valve using scientific background and simulation will be done using simulation software AutoCast-X and optimized solution will be derived by compromising between the real and virtual world. This lead to decrease in cost of production, time and man hour, thus increasing yield and profit.



CONIC SECTIONS: GRAPHICAL METHODS IN MECHANICAL ENGINEERING

T 02

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Abstract

From ancient decades mathematics is useful in each engineering field. As we say drawing is the language of engineering and to understand this language mathematics is required. In this paper fundamental property of conic sections of mathematics is compared with graphical methods which can be useful in designing and construction of many mechanical objects.



REAL WORLD APPLICATIONS OF CONIC SECTIONS

T 03

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Abstract

Mathematics is a human intellectual enterprise with a long history. In recent technological world fundamental of mathematics of conic sections are used in different engineering field. In this paper the conic sections, its properties and its applications in different fields like mechanical, structure, architecture, aerospace, trajectory, medical are discussed.

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Abstract

In this research we turn up with a ranking method based on nonagon fuzzy numbers in which the transportation precedent like demand, supply and transportation cost are nonagon fuzzy numbers. We carry out Vogel's approximation method in fuzzy version for finding fuzzy transportation problem to obtain fuzzy optimal solution. This method provides an accomplished nourishment of fruit diet with low cost for the normal people to stay happy, strong and healthy.

Keywords: Fuzzy transportation problem, Nonagon fuzzy number, Ranking function, human balanced diet

AMS Subject classification: 90B06, 90C08, 90C70, 90C90, 97A40, 97M40



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Abstract

The exact analytical and numerical solution for MHD flow of a generalized non-Newtonian fluid filling the porous half-space is investigated. The formulation of the problem is given using modified Darcy's law for a present fluid. The fluid is incompressible, electrically conducting and a uniform magnetic field is applied normal to the flow by neglecting the induced magnetic field. The governing non-linear partial differential equation with auxiliary conditions is derived and it then reduced to by employing reduction and solutions have been developed using the similarity approach. Both analytical and Numerical solutions are derived. The influence of various parameters of interest has been shown and discussed in detail. A comparison of the present analysis with those available, shows excellent agreement between analytic and numerical solutions. Besides the importance of exact solutions the non-Newtonian flows in a porous medium are important in engineering fields such as enhanced oil recovery, paper and textile coating and composite manufacturing processes.



LOAD BALANCING IN CLOUD COMPUTING ENVIRONMENT USING MATHEMATICAL ANALYSIS: A REVIEW

T 06

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Abstract

A task division of load balancing between a given number of Virtual Machines (VMs) in a scattered system suffers from lower performance and poor scalability caused by unbalanced load allocation typical in real-world applications. The reason behind this is due to the uncalculated load of VMs and allocation on the same. Task Distribution can help to improve load balancing and Reliability of VMs. In this paper, we review an optimization algorithm based on load calculation (Mathematical Model) for task allocation in a cloud environment.



AN ANALYSIS OF DIFFERENT COMPUTER SCIENCE ALGORITHMS WITH THE GRAPH THEORY OF MATHEMATICS

T 07

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Vatsal Shah

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Abstract

The field of mathematics plays an important role in different domains. One of the important concepts of mathematics is the Graph theory which is most commonly used in the area of computer science to design computer algorithms. The well-known problem in mathematics which represents graph theory is the Travelling salesman problem. The travelling salesman problem is the problem in graph theory that needs to find an optimal path (i.e. minimum total distance) to traverse all the cities with the constraint of returning back to the initial state (city). There are no general solutions available to solve this problem but there is a similarity between the travelling salesman problem and minimum spanning tree. So, this problem can be implemented with the help of minimum spanning tree which also focuses on finding the minimum distance for each node with the constraint of not forming any cycle. In this paper, we have presented a few computer science algorithms which are implemented using graph theory of mathematics and also tried to analyze their differences and applications.



ALGORITHM IN SAGEMATH TO FIND DETERMINING EQUATIONS FOR INFINITSIMALS OF PDE OF FIRST ORDER USING LIE SYMMETRY

T 08

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Abstract

In this paper algorithm is developed in open source SageMath software to find the set of determining equations for infinitesimals T, X and Y of first order PDE. On solving these determining equations we obtain values of infinitesimals T, X and U . Then by considering particular symmetry we solve characteristic equations.

$$\frac{dt}{T} = \frac{dx}{X} = \frac{du}{U}$$

On solving we obtain solution form or “ansatz” which on substituting into the original equation, we obtain an ODE which on solving gives the exact solution of first order PDE.

Keywords : First order PDE, Open source SageMath software, Lie symmetry, determining equations for infinitesimals.



A SURVEY ON STRING MATCHING ALGORITHMS FOR TEXT MINING

T 09

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Abstract

String matching is considered classical problem in computer science. Detecting and Extracting normal patterns or specific text from the massive amount of online or offline data are gaining more attention in the world of Big Data Analysis. Researchers have proposed a number of searching algorithms for pattern matching from large volume of data. Most of these algorithms are based on string matching concept. String matching is the technique of finding the occurrences of a character pattern in a given string. To analyze content of documents, various pattern matching algorithms are used to find all the occurrence of limited set of patterns within an input text or input document. String matching algorithms can be categorized as exact string matching algorithms or approximate string matching algorithms. And based on the kind of application, string matching algorithms are designed either to work on single

pattern or multiple patterns. There are many different solutions for this problem and this paper presents the four best-known string matching algorithms: Naïve (Brute Force), Knuth-Morris-Pratt, Boyer-Moore and Rabin-Karp. In this paper we are trying to explore the various diversified fields where string matching algorithm and its mathematical model has an eminent role to play and is found as a solution to many problems. String Matching Algorithms are used in the field of Text Mining, documentation classification, content analysis, intrusion detection in networks, applications in bioinformatics, plagiarism detection, information security and pattern recognition. We have also shown comparison between different string matching algorithms.

Keywords: Naïve String Matching, Knuth-Morris Pratt, Boyer-Moore, Rabin-Karp, Intrusion detection, Text Mining, Content analysis.



FRAME THEORY AND ITS APPLICATIONS: A REVIEW

T 10

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Abstract

Frame analysis is a relatively new mathematical discipline which has generated much interest in both theoretical and applied mathematics over the past decade. A frame can be defined as a family of vectors which serves as building blocks for other vectors of the space. The members of the frame are able to recover every vector of the space fully. This study provides a comprehensive review of the basics of frame theory and the importance and potential of frames. After recalling some background information on frame theory and their advantageous over basis expansion in a variety of practical applications, we introduce several notions generalizing the concepts of frame for spaces (Hilbert or Banach). We depict the current state of the research in finite frame theory and cover the progress which has been made in the area over the last twenty years. Due to well known application of frames, we took up the study of some generalization of frames in Banach spaces and Hilbert spaces in the finite context.



HYBRID REACTIVE POWER COMPENSATION USING COORDINATED CONTROL STRATEGY AND CLARKE TRANSFORMATION

T 11

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Abstract

Now a day power system is highly complex and design to operate very efficiently to supply power on demand to various load centres with high reliability. Since reactive power does not do any genuine work, the load compensation by shunt connected compensators which are fast acting to maintain unity power factor is mandatory. A combine system

based on thyristor switch capacitor (TSC) and Voltage source converter (VSC) which are aimed to continuously compensate system required reactive power with high quality and lower cost. The TSC will provide stepped reactive power compensation which will act as main tuning and lead reactive power at minimum level for further compensation, while fast response of VSC will use for further compensation of reactive power. Thus, TSC use as main tuning and VSC is use as fine tuning of reactive power compensation. This paper focus on the controlling part of TSC and VSC with the help of advance engineering mathematics which uses Clarke Transformation, Inverse Clarke Transformation, PI control and various other math operations and methods to co-ordinate TSC and VSC operations. Thus, the full system will make power factor from any value to unity and make system more efficient, satisfactory and cost-efficient level.



“POWER SYSTEM STABILITY IMPROVEMENT BY FACTS DEVICES: COMPARISON OF STATCOM, SSSC AND UPFC” USING THE OPTIMIZATION TECHNIQUE AND DIFFERENTIAL EQUATION. T 12

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Abstract

In this paper we are talking about a FACTS device named as STATCOM (Static Synchronous Compensator), SSSC (Static Synchronous Series Compensator) and UPFC (Unified Power Flow Controller) and suppressing undesirable electromechanical oscillation in power system by these FACTS devices. The dynamic system damping can be measured by using the rate of dissipation of transient energy. This paper deals with the different control methods for minimizing unwanted electromechanical perturbations and disturbances in power system with STATCOM, SSSC and UPFC. The STATCOM can supply variable reactive power and voltage to the bus where it is necessary. SSSC has a VSC (voltage source converter) and series insertion transformer which voltage is injected in series with transmission line. UPFC is special aspect are to control active and reactive power course in a transmission line and to adjust the voltage at the bus at which it is situated. A SMIB (Single Machine Infinite Bus) was simulated under several variations of situations. The results concluded depicts the functionality and robustness of these devices on power system stability. In this paper the amount of active power flow and reactive power flow will be approximated by using the maximization function of the optimization technique. Along with this, the swing equation will be discussed for the stability concern by application of the differential equations.



JOURNEY OF REGRESSION ANALYSIS FROM STATISTICAL METHODS TO SOFT COMPUTING TECHNIQUES T 13

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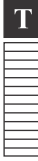
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Abstract:

Regression Analysis (RA) is widely used method of prediction in various fields. In business it is used to enhance productivity and business gain. It can also be used for prediction of underlying relationship in stock market. An engineer too can get insight by finding trends in data sets using RA to develop effective algorithms which help to make raw data more useful in the enterprise and many more. This paper discusses the journey of regression analysis for prediction or forecasting using statistical methods to the soft computing techniques like Support Vector Machine (SVM).



ANALYSIS & MODELING OF SINGLE-PHASE DYNAMIC VOLTAGE RESTORER FOR VOLTAGE SAG MITIGATION USING LINEAR EQUATION.

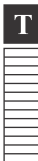
T 14

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Abstract

Dynamic voltage restorer (DVR) is a custom power device used in electrical distribution system for power quality improvement. Different causes may produce voltage sags such as lightning, presence of non-linear equipment connected to the power grid or presence of short circuit faults. Sensitive loads, like electronic equipments, may be damaged or present malfunctioning during the voltage sag, generating economical losses. A suitable solution to mitigate this voltage disturbance is the Dynamic Voltage Restorer (DVR). It is a power electronics based solution that provides power compensation to sensitive loads during the sag occurrence. The DVR must operate with control loops, monitoring the load voltage and generate the compensation during the sag. Those control loops must be tuned with aid of a mathematical model, a performance criteria and a proper design procedure of the controller. In this paper modeling of series converter and controller design for series converter is also shown. A small-signal equivalent circuit will be obtained and its analysis will produce the control-to-output transfer function. Using the control-to-output transfer function a PI(proportional & Integral) voltage controller will be designed. This PI design methods will be described and the proper operation will be verified through MATLAB simulation.



APPLICATION OF MATHEMATICS IN VARIOUS CONTROL SCHEMES FOR HYBRID MULTILEVEL INVERTER FOR PV APPLICATION TO IMPROVE POWER QUALITY.

T 15

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Abstract

Dwindling supply of Fossil fuel and rising cost have inspired efforts to find alternative energy sources. The increasing use of renewable energy sources requires new strategies for the operation and control of the electricity to improve the power supply reliability and quality due to promising potential as a source for future electricity, photovoltaic energy conversion is becoming the main focus of many researches. Multilevel converters are mainly used to synchronize electrical grids with renewable energy sources. This paper focuses on application of Mathematics to electrical Engineering, with the use of various controlling strategies based purely on mathematics to reduce THD that means power quality will improve. This paper will demonstrate effect on power quality with different control strategies. A simulation validation of single-phase five-level hybrid MLI using MATLAB simulink has been carried out.



MATHEMATICAL MODELING AND STABILITY ANALYSIS OF A RESERVOIR

T 16

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Abstract

River basins are key components of water supply grids. Also, they are largely operated in open-loop modes. There is a difficulty associated with the development of suitable models. Traditionally, river basin modeling efforts have a focus on process-based methodologies that are potentially very accurate, but not amenable to the design of feedback controllers.

We aim to develop a mathematical model for a reservoir that supplies water for irrigation and domestic use, moreover, we have considered water losses due to evaporation and water gain by the river and sewage line across the city. We have to obtain a system of linear differential equations which have been solved numerically and then done a sensitivity analysis of a system.



CONVEYOR PULLEY DESIGN USING FINITE ELEMENT METHOD

T 17

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Abstract

In the Conveyor Pulley generally the ratio of the outer diameter of the pulley to that of the outer diameter of the shaft is a measure of the flexible nature of the end disc, and this ratio was approximately 6 to 8. Now if the ratio of OD/SD which is smaller than conveyor pulley and end disc will tend to rigid. If the ratio of OD/SD which is larger than conveyor pulley and end disc will tend to be flexible. So that for increasing the strength to weight ratio and also to improve the welding design in the connection between two components can be done by using Finite Element Analysis technique.



A MATHEMATICAL MODEL FOR THE EFFECT OF PARATHYROID HORMONE USING FUZZY LAPLACE DISTRIBUTION

T 19

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Abstract

In the paper we developed a mathematical model using fuzzy two parameter Laplace distribution and used to find the effect of serum parathyroid hormone response to low calcium dialysis, before and after calcitriol treatment. The result shows that in the test termination, if the fuzzy survival rate increases then the fuzzy hazard rate decreases and vice versa for the effect of parathyroid hormone response.

Keywords : Mathematical modeling, Laplace distribution, fuzzy survivor function, fuzzy hazard function, parathyroid hormone.

2000 Mathematics Subject Classification : 00A71, 60E05, 62-07, 62NO5, 62P10.



DEEP LEARNING BASED ALGORITHM FOR IMAGE CAPTIONING

T 20

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Abstract

Automatically describing the content of an image is a fundamental problem in artificial intelligence that connects computer vision and natural language processing. A generative model based on a deep learning architecture is a combination of advanced level computer vision and machine translation algorithms. It can be used to generate natural sentences from the input image. The process is divided into 2 segments: First, feature extraction using Convolution Neural Network (CNN) architecture and classification. Second, Long Short Term Memory (LSTM) language model, has been used for learning sequence iteratively and finally formation of sentence was made. The effectiveness of the proposed approach is validated on 3 datasets: FLiker30k, MS COCO, and Pascal VOC. The performance of the model was evaluated using standard evaluation matrices.



WINDING VOLTAGE OF PHASE SHIFTING TRANSFORMER USING VECTOR CALCULATION AND PHASOR DIAGRAM.

T 21

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Abstract

The purpose of this paper is to give idea about recent advancement in transformer design using mathematical application of vector calculus. Now a day smooth controlling switching device inject large amount of harmonics at source side. The main objective of this paper is to design phase shifting transformer to reduce harmonics according to IEEE standard 519-1992. Paper Contains Traditional design of transformer. Star delta winding can give 6 and 12 pulse at output with tremendous harmonics at source side. So, it requires large sized filter which increase cost of overall system and can create resonance also. So, phase shifting transformer can be used to eliminate harmonics at source side which reduce cost as well as size of system. So, to increase no. of pulse for reduction in THD extended delta winding is used. Winding voltage calculation is done according to no. of pulse required at output side. As the no. of pulse increases THD at source side reduces. Paper include winding calculation and phasor diagram with Matlab simulation of 6, 12, 18 and 24 pulse converter. Comparison of 6, 12, 18 and 24 pulse results and reduced harmonics less than 5% according to IEEE standard 519-1992.



SOLUTION OF NON LINEAR PARTIAL DIFFERENTIAL EQUATION ARISING IN LONGITUDINAL DISPERSION PHENOMENON

T 22

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Abstract

The main aim of the paper is on longitudinal dispersion phenomenon and its governing non linear partial differential equation has been analyzed by Elzaki Adomian Decomposition Method with its convergence. For accuracy of the solution of the problem, comparison has been included with approximate analytical methods and numerical method. MATLAB and MATHEMATICA are helpful to obtain numerical solution and graphical representation.

Keywords: Elzaki Adomian Decomposition Method, Longitudinal Dispersion Phenomenon, Non linear partial differential equation and Porous medium.

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Abstract

In the online world, the transactions required additional security based on standard currencies. Bitcoin is one of the digital payment or cryptocurrency system which does not have a central player as a bank or government. It verifies each transaction in the shared network of computers, each of which is encrypted using mathematical formulas and chain of ledger called blockchain.

The blockchain link transactions and restrict the bitcoin owner to spend the same coin twice. Every bitcoin owner has a private code and mathematical formulas make it simple to access but impossible to find out. Thus, it is far less vulnerable than the original currency.

The mathematics behind blockchain is a one-way hash function, computational complexity of proof of work, encryption based on the private key. This would allow tracking of coin throughout its journey and give security, digital, unalterable records of any documents. The application based on the mathematical computational power is in companies for documentation, Refugees for IDs, banks for transactions, etc.



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Abstract

The definitions of comfort are not widely accepted since it is beyond dispute that comfort and discomfort are feelings or emotions that are subjective in nature. Comfort can be a generic and subjective feeling that is tough to measure, interpret, and also can be related to human physiological homeostasis and psychological behavior. This paper presents the application of fuzzy set model/fuzzy reasoning expert system to obtain/to achieve the comfort levels for the bus seating system. Fuzzy modeling enables us to transform linguistic information into an algorithm for which result is an action. The theories applied in fuzzy modeling are fuzzy logic and the fuzzy set theory. Variables in a fuzzy theory may represent fuzzy subsets of the universe. The precise mathematical models are not necessary to be developed to determine comfort rating values but it uses high levels of variables leading to high comfort levels. The fuzzy model set was applied for bus seat assembly. The aim is to achieve the comfort level i.e. the problem is defined in linguistic variables. The fuzzy set is then determined for the input variables viz. Foam hardness & foam thickness. The design of the rule base is described and the system is evaluated by using extensive, worst-case, simulation results. A triangle shape of fuzzy set is used throughout the process for simplification of computation process.

Keywords: Fuzzy set model, linguistic variables, triangle shape of fuzzy set.

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Abstract

This paper focuses on how the different matrix multiplication algorithm works as well as how to calculate the time complexity by using different Algorithmic methods. In this paper it is mentioned the time complexity issues which has been reduced by different algorithms.

Keywords: Matrix, Time complexity



DESIGN OF A COLOR PALETTE BASED IMAGE STEGANOGRAPHY ALGORITHM FOR FRACTAL IMAGES

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Abstract

Image steganography is a smart technique of embedding the secret information into the cover image without any visual loss. As fractal image represents self-similar patterns, more number of bits can be embedded. A color palette based image steganography algorithm for the iterated Julia- set fractal image is proposed. The color palette is created and sorted based on the illumination values of the pixels. The palette is being scanned for embedding the secret bit, and the palette index is modified based on the secret bit's value. For improving the robustness of the algorithm, a random pixel selection technique is suggested and implemented effectively. The proposed algorithm gives maximum peak signal to noise ratio (PSNR), up to the number 61, and Normalized Correlation (NC) of 0.999 for approximately 50 images.

Keywords: Steganography, fractals, palette based images, Julia set, NC, PSNR.

signals from noisy data. This paper describes SVD methods for visualization of data, representation of the data using a smaller number of variables, and detection of patterns in noisy expression data. In addition, it describes the mathematical relation between SVD analysis and Principal Component Analysis (PCA).

Keywords: Singular value decomposition (SVD), Principal component analysis (PCA), Eigenvalue decomposition, Eigen-vectors Computation and Low-Rank Approximation.



DISCRETE DYNAMICAL BEHAVIOUR IN MODULATED DIFFERENCE MAPS

T 30

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Abstract

In the last few decades, the discrete chaotification of difference equations has gained a massive attention of academicians and scholars due to its tremendous applications in each and every branch of science, such as cryptography, traffic control models, secure communications, weather forecasting and engineering. In this article, a modulated logistic system is introduced and superior chaos is reported through period doubling bifurcation, period three orbit and Lyapunov exponent. It is interesting to see that the modulated system admits superiority in chaos due to the presence of an extra degree of freedom of an ordered parameter. The period doubling and Lyapunov exponent properties are demonstrated for some particular values of parameter and the discrete chaos is examined theoretically as well as numerically. Moreover, the study discusses an extended chaos based image encryption scheme in cryptography using modulated system. Surprisingly, a larger key space for coding and more sensitive dependence on initial conditions are discussed for encryption of text messages, images and videos which may secure the system strongly from external cyber attacks, coding attacks, statistic attacks and differential attacks.



GAME THEORY: A COMPREHENSIVE REVIEW

T 31

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Abstract

Game theory is a notional skeleton for visualizing social conditions among contending troupe. In several contexts, game theory is the science of tactic, the decision-making process of sovereign and contending players in a strategic situation. Game theory has a spectrum of applications; some of them are economics, diplomatic tactic, war, evolutionary biology, politics, and business. Despite its continual progress through the years, game theory is still an adolescent and developing subject. The game theory comprises of key entities like Game, Players, Strategy, payoff, Information set, & Equilibrium. There are several complex situations that game theories examine some of them are, The Prisoner's Dilemma, Dictator Game, Volunteer's Dilemma & the Centipede Game. There are a few limitations of Game Theory. The major concern with game theory is that, like all other economic patterns, it relies on the supposition that communities are the rational players that are self-motivated and opportunity exploiter. Game theory has come to play and gradually a more significant position in logic and in computer research. Quite a few logical hypotheses have a foundation in game semantics. Additionally, computer researchers have used games to replicate interactive computations. Furthermore, game theory offers a theoretical source to the field of multi-agent systems. Game theory has also confronted logician to imagine with respect to interactive epistemology: what it means for a group to have general attitude or awareness, and what is the cost of this awareness for the society from the communications of players.



A LITERATURE SURVEY ON IMPORTANCE OF STATISTICAL METHODS FOR DATA MINING

T 32

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Abstract

Data mining (DM) is the study and analysis of large quantities of data in order to discover meaningful patterns and rules. Now a day's technological advancement led to new and automated data collection methods. Datasets are often plentiful and sometimes indeed massive. So the challenges are to analyze data from many different dimensions, categorize it, and summarize the relationships identified into useful information. From the point of view of Statistics, concepts in Statistics are widely used in data mining for analyzing large data sets and for finding patterns/ correlations among various fields in large relational databases. Thus, Data mining is the application of Statistics in the form of exploratory data analysis and prediction models to reveal patterns and trends in huge datasets. Data Mining and Statistics are having different origin but used for common purpose. Many of us are unable to understand scope and limitations of both disciplines and how it is interrelated. The aim of this paper is to focus on applications of Statistics used in Data mining process and also the linkage between Data Mining and Statistics.

Key words: Data mining, KDD, Statistics



A SURVEY : LINEAR ALGEBRA FOR CRYPTOGRAPHY APPLICATION

T 33

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Abstract

Due to the rapid growth of computer society, information security becomes more and more important for human life and new emerging technologies are developing in an endless stream. Cryptography is one of the most important techniques used for secure communication and protection of data. Today, Cryptography plays an important part includes, e-commerce; electronic communications such as mobile communications, sending private emails; business transactions; Pay-TV; transmitting financial information; security of ATM cards; computer passwords etc, which touches on many aspects of our daily lives. Cryptography provides privacy and security for the secret information by hiding it through mathematical technique. Modern cryptography focuses more on Mathematics to develop secrets codes because advances in mathematic operations and computing power, the need, and also capability, of cryptography are constantly increasing. To provide security different versions of cryptography are used such as symmetric key, asymmetric key, and hash function; there are also many different ways to develop a cipher. In this paper, I present applications and fundamentals of the field of cryptography that rely heavily on tools defined by linear algebra. Linear algebra permitting the manipulation of multiple variables simultaneously to create a unique and reversible output.

Keywords: Linear Algebra, Cryptography, Information Security.

SECTION - E
STUDENT'S SPECIAL SESSION

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Abstract

The history of the Pythagorean theorem can be divided into four parts: knowledge of the relationship among the sides of the right triangle, knowledge of the relationship among adjacent angles and proofs of the theorem within some deductive system.

The Pythagorean Theorem has been proved many times, and probably will be proven many more times. But only one proof was made by a United States President. Five years before James A Garfield was elected president, he came up with a proof that involves a simple sheet of paper and some scissors. Before President Garfield went into politics, he wanted to become a mathematics professor. He had a lively interest in math, and studied even after he decided to run for Congress. One day, he was discussing mathematics with other members of the House of Representatives — and how great would it be if mathematics was still discussed for fun by members of Congress — he came up with a simple proof of the Pythagorean Theorem.

In this paper we discuss proof of pythagorean which is given by the President of United States James A Garfield also we discuss some of its application in various field.

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Abstract

In the sphere of science and mathematics, information is generally organized in rectangular arrays. In this paper, we have tried to sum up some concepts of linear algebra which cater to the need of solving numerous problems arising in multiple fields. Holistically speaking, linear algebra finds its applications almost everywhere including the area of commerce, biology, graphics and so on. This paper sets forth the use of linear algebra in genetics and forest management. Besides, it delineates as to how it is used to determine age specific population growth as well as its significance in linear programming.

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Abstract

In the world of mathematics, golden ratio is numeric value, which called “phi”, name from the Greek sculptor Phidias. From the history of mathematics, the ratio 1.6180339887 has been considered from length to width of rectangles, which is most pleasing to the eye. This ratio was named golden ratio by the Greek sculpture. Because of its unique and mystifying properties, many researches and mathematicians have been studied about the golden ratio, which is also known as golden section. This paper seeks to represent a panoptic view of golden section and its relation with the nature, globe and universe. Many architectures, musicians, arts, are following it. The Equation of Phi based on classical geometric relations. The ratio also plays an enigmatic role in the geometry and mathematics.

Keywords : Golden Ratio, Fibonacci Series, Phi, Geometric, Nature.

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Abstract

In this paper of Space time Concepts it deals with main topics like Reference Frame, Time dilation, Length Contraction, Gravitation and mainly Galilean transformation, Lorentz transformation, energy and momentum. Non-relativistic classical mechanics treats time as a universal quantity of measurement which is uniform throughout space, and separate from space. Mathematically, space time is a manifold, which is to say, it appears locally "flat" near each point in the same way that, at small enough scales, a globe appears flat. The space-time concept and the Lorentz group are closely connected to certain types of sphere, hyperbolic, or conformal geometries and their transformation groups. This space time research was done by many scientists whose contribution to this field was more than enough like Hendrik Lorentz, Henri Poincaré, Albert Einstein, Hermann Minkowski have done work for it. In this it deals with basic mathematics in concept like In Galilean transformation gives the idea of comparing the measurement of relative motion while in Realistic mechanics the momentum vector is extended to four dimensions. In this way above topics give qualitative explanation to special relativity and as well as for understanding the time travel concepts today also it help us to understand the existence of universe and in the branch of cosmology.

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Sorting is the basic operation in most of application of the Computer-Science. Sorting means to arrange the data inside the computer, in particular order. Sorting algorithms are a major area of research in computer science and engineering where the simple task of sorting the numbers leads to complex algorithms. In recent years, many researchers have proposed several sorting techniques to enhance time and space complexities of the algorithms. In this paper we have discussed the performance of different sorting algorithm and their advantages and disadvantages. The paper also represents the application area of different sorting algorithm. We have compare bubble Sort, Selection Sort, Insertion Sort, Insertion Sort, Heap Sort, Bucket Sort, Radix Sort and Counting Sort and have compare the time complexity in the graphical manner and also derive their complexity. Main goal of the paper is to compare the performance of different sorting algorithm based on the different parameters.

Keywords: Sorting, Bubble sort, Selection sort, Insertion sort, Bucket sort, Radix sort, Heap sort, Counting sort.

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Mainly AI works on 3 key elements which help e-commerce business to improve results, they are Data Mining, NLP, and ML. As we know that AI is a trend as it gives us so many opportunities. Search engines are also working hard in this field, improving the image search technology. For smaller companies this is a huge push towards growth, an opportunity they haven't had before. There are other ways using artificial intelligence in e-commerce and in this article, we will show you powerful and practical ways to do that. Usage of AI in e-commerce is to better understand customers, generate new leads and provide an enhanced user experience. This article contains the most popular applications of artificial intelligence in E-Commerce. It also includes many case studies about many companies. Many advantages and disadvantages of AI in e-commerce. It also shows how predictions using Machine Language in E-Commerce can help in future. How machine learning in E-Commerce help in improving the quality of the search engine.

Keywords: Artificial intelligence, Machine Learning, E-commerce, Data Mining.

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Travelling salesman problem (TSP) is combinatorial optimization problem. The idea of the traveling salesman problem (TSP) is to find a tour of a given number of cities, visiting each city exactly once and returning to the starting city where the length of this tour is minimized. TSP is the most intensively studied problem in the area of optimization but with the increase in the number of cities the complexity of the problem goes on increasing. Travelling Salesman problem (TSP) is always fascinating for the computational scientists and poses interesting challenges to formulate fast and effective algorithms for its solution. TSP problem can be solved using different techniques-Genetic algorithm, Ant colony optimization, Artificial neural network, Particle Swarm optimization etc. In this proposed paper, Travelling salesman problem using Genetic Algorithm approach. System starts from a matrix of the calculated Euclidean distances between the cities to be visited by the travelling salesman and randomly chosen city. The amount of computational time to solve this problem grows exponentially as the number of cities. These problems demand innovative solutions if they are to be solved within a reasonable amount of time. TSP is a NP hard problem.

Keywords: TSP (Travelling salesman problem), NP hard, Genetic Algorithm, Ant colony optimization, Artificial neural network, Particle Swarm optimization.

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Email: dancydharsandia911@gmail.com***Sunaina Desai***Student, MBIT College, New V. V. Nagar, Anand, Gujarat, India. Email: sunainacdesai@gmail.com***Abstract**

In this paper survey of methods of Vedic Mathematics is done. Though it is an old method but it is still used in our day to day life. Various methods of Vedic mathematics like: Memory versus calculation, Addition is commutative, addition is associative, Partitioning and Reorganising, Subtraction from power of 10 etc. are used. Multiplication and division, square and square root, cube and cube root are found by Swami Shree Bharati Krishna Tirthaji. So will have also explained about the golden history of Vedic Mathematics. Swami Shree Bharati Krishna Tirtha thought deeply on this and tried to utilize algebra for simplifying these processes and constructed 16 formulas (sutras) and 13 Sub-formulas (Upsutrans) and worked on Vedic mathematics. Book is also written on Vedic mathematics named by "Book and its Magic Effect". Fast Calculation is very interesting and we like to do it. This education method increases the interest of student for learning maths. Maths is easy for graduate people and tough for normal people who are studying maths, so we will introduce some shortcut using Vedic mathematics.

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Abstract

Computational neuroscience, broadly defined, is the mathematical and physical modeling of neural processes at a specific chosen scale, from molecular and cellular to systems, for the purpose of understanding how the brain and related structures represent and process information. The ultimate objective is to provide an understanding of how the organism takes in sensory information, how such information is integrated and used in the brain, and how the output of such processing results in meaningful decisions and behaviors by the organism to allow it to function and thrive in its environment. This endeavor involves the building of computational models that aim to replicate and explain observed or measured data in order to arrive at a deeper understanding of the dynamics of brain function. Beginning with a set of experimental observations or measurements, a model is postulated that aims to provide a set of rules or relationships that if given the initial experimental observations (or at least part of such a set) would be able to describe and explain some desired aspects or properties of the experimental measurements, such as casual, correlative, or mechanistic relationships between the data and underlying molecular, cellular, and systems mechanisms that produced it. In general, this process almost always begins with a qualitative “guess” about how the data fit together and what are the likely rules that govern the relationships between it. This is subject to a number of uncontrollable variables, including the amount and quality (e.g., accuracy and precision) of the data, how general or narrow the acquisition conditions were under which it was collected, which may constrain the generality and applicability of the model, and the degree of understanding and expertise on the part of the investigator constructing the model about the neurobiology which the data describe. This qualitative picture of the model is then “translated” into a quantitative mathematical framework which almost always involves expressing the hypothesized relationships as ordinary or partial differential equations or related objects, such as difference equations, as state variables that evolve in space and/or time.

Keywords: Computational Neuroscience, sensory information, neurological processes, experimental measurements, mathematical framework, neurobiology.



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Abstract

In up thronging world of internet, security becomes main concern. Data security, network security, computer security is required to be scrutinized. Threats and attacks are getting sophisticated. Role of mathematics is observed at this part. Via this paper we had tried to provide an essential timeline of network and Internet security. We had highlighted cryptography and encryption strategies that bonds with mathematics. Key issues in cyber security from beginning and how timely solutions are driven for this concern are focus upon. We had also tried to identify the stumbling blocks of current circumstances and also which of them can be sorted from statistical perspective. For exploring any system, access to current statistics becomes necessary and unignorable. We had assumed that few of existing cyber security solutions affects the established system negatively and hence it requires modification. Posterier to it, we had tried to specify altogether that cyber-security has a bunch full of research scope concerning for mathematics and allied branches

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Abstract

Prime numbers have always remained a matter fascination to the mathematicians, and many scientific and technical communities. Also, it has paramount applications for computer engineers to solve myriad real problems. In this paper, twenty different types of prime numbers have been covered and Python programs to generate them are given, with the Python library. Asymmetric algorithm has been used for key exchange between client and server; it is significant because of the prime factorization NP-problem. In the encryption system, prime number play the major role to crack security system where prime factorization is necessary, so the analysis for the same has been shown in this paper, by generating prime numbers on various platforms (Windows, Os X, and Ubuntu) and by prime factorization using three different algorithms. In prime factorization, the comparison between Composite numbers vs. the time it takes to Factorize is plotted on the graphs. Two of the major applications of prime numbers which are Cryptography and Cicada have also been covered in this paper.

Keywords: Python, Python Library, Cryptography, Cicada, Brute Force, R programming, Asymmetric Crypto system and Factorization.

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Abstract

Today, the computer has retained its mathematical identity despite its general application in all areas of human activity. Mathematics will impart a student with the art of reading, understanding and analyzing a problem before coming up with a solution. All these skills are vital when it comes to programming and computer science in general. Mathematics provides the analytical skills required in computer science. Mathematical concepts are required in many disciplines of computer science. An algorithm is commonly used term in the field of computer science and technology in general. Even heard of logic notation, set theory, combinatory, graph theory, probability, number theory, algebra, etc. These are all a part of discrete mathematics and also a basic foundation for programming and computer science. Computer science is an umbrella term that contains many disciplines like operating Systems, databases, networking, artificial intelligence, embedded system, data Analytic. And while there are some disciplines that you can handle with minimum knowledge of mathematics, most of them require at least some level of competency. For example, field like Artificial intelligence and Machine learning. Differential equations can be found in software to simulate traffic or health conditions. Statistics is used in many computer programming applications including polling systems, reports and card games. Mathematics is present in the foundation of computer science. Thus in this paper will explore areas of computer science where mathematics is used.

Keywords: Mathematics, Computer Science, Algorithm.

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Abstract

Matrices are used much more in daily life than people would have thought. In fact it is in front of us every day when going to work, at the university and even at home. Graphic software such as Adobe Photoshop on your personal computer uses matrices to process linear transformations to render images. A square matrix can represent a linear transformation of a geometric object. Matrix used to solve computer applications such as pubg, photoshop, etc they are also used in cryptography. We first use matrices to represent points, lines and polygons. We then discuss in detail some

linear transformations such as translation, scaling, rotation, reflections and examine how transformations can be concatenated using matrix multiplication with parallel and perspective view. Using matrices to manipulate points is a common mathematical approach in video games. Scaling, rotating, shear and reflection are important operations used in graphics.

Keywords: Geometric transformations, Computer graphics, Matrices, Graphics operations, Video game graphics.



S



ASURVEY OF RLC NETWORK CIRCUIT USING MATHEMATICS

S 14

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Abstract

This Paper investigates the application of RLC Diagrams in the catena study of linear RLC closed series electric circuits. The Relevant Second Order Ordinary Differential Equations were solved by Kirchoff's Voltage Law. This solution obtained was employed to procedure RLC Diagram simulated by MATLAB. A circuit containing an Inductance 'L' or Capacitor 'C' and Resistor 'R' with Current and Voltage variable given by Differential Equation. The general solution of Differential Equation represents the complete response of network. In this connection, this paper includes RLC Circuit and Ordinary Differential Equation of Second Order and its solution.

Keywords: Mathematics, MATLAB, First order RC and RL circuits.



S



THE IMPORTANCE OF MATHEMATICS IN THE DEVELOPMENT OF SCIENCE AND TECHNOLOGY

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Abstract

The study of mathematics as a "demonstrative discipline" begins in the 6th century BC with the Pythagoreans, who coined the term "mathematics" from the ancient Greek, meaning "subject of instruction". The ancient Romans used applied mathematics in surveying, structural engineering, mechanical engineering, and bookkeeping, creation of lunar and solar calendars. In this paper we shall discuss the mathematicians and their contributions in the development of science and technology ranging from 15th century to the present day. We shall be discussing the contribution from 15th century mathematician Isaac Newton to 21st century mathematicians.

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Abstract

This paper presents an overview of application of mathematics in machine learning. We also provide an introductory part of machine learning. Machine learning is the subfield of computer science concerned with creating machines that can improve from experience and interaction. It is one of the most exciting recent technologies in Artificial Intelligence. It is a field that intersects statistical, probabilistic, computer science and algorithmic aspects arising from learning iteratively from data and finding hidden insights which can be used to build intelligent application. It relies upon mathematical optimization, statistics, and algorithm design. Rapid empirical success in this field currently outstrips mathematical understanding.

Keywords: Mathematics, Machine Learning, Statistics, Probability.

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Abstract

We are living in a world where people are not equal in terms of physical abilities. We wish to count the ability and not the disability by lifelong learning. Every disabled person has right to learn and grow through life long learning. The disability should not be a hurdle to acquire capabilities of lifelong learning. . It is a small AI enabled wearable prototype for identifying gestures of most of the human activities (HAR- Human Activity Recognition). For life long learning and creating further capabilities such low cost and easy to use open source hardware can elevate the confidence level of PWD, The hardware is capable generating alphanumeric characters, words, sentences or controlling any apparatus by providing required training data for small AI enabled hardware. The technology is open source and uses easy to access hardware. The device is multifaceted and can be used for old age people to learn even. Human Activity / Gestures A gesture is a form of non-verbal communication or non-vocal communication in which visible bodily actions communicate particular messages, either in place of, or in conjunction with, speech. Gestures include movement of the hands, face, or other parts of the body.

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INTERNATIONAL CONFERENCE ICHDMAST-2019



17th - 19th December 2019

PROGRAM SCHEDULE



17 th December, 2019			
8:00 am to 9:30 am	REGISTRATION & BREAKFAST		Near ADIT Audi.
9:30 am to 11:30 am	INAUGURAL FUNCTION		ADIT Audi.
11:30 am to 11:45 am	GROUP PHOTO SESSION FOLLOWED BY HIGH TEA		Outside ADIT Audi.
11:45 am to 01:15 pm	PLENARY TALKS-1 (30 Min. Each) Session Chair: <i>Norbert A Campo, Switzerland</i>		ADIT Audi.
	<i>S G Dani, Mumbai</i>		
	<i>Kim Plofker, USA</i>		
	<i>Satyana Kichenassamy, France</i>		
1:15 pm to 02:00 pm	LUNCH		Near MBIT Canteen
2:00 pm to 04:00 pm	TECHNICAL SESSION-1 (30 Min. Each) Session Chair: <i>M. S. Sriram, Chennai</i>	PROF. S. L. SINGH MEMORIAL SYMPOSIUM (20 Min. Each) Session Chair: <i>M. C. Joshi, Nainital</i>	SESSION 1 Room A301 SYMPOSIUM Conference Room
	<i>Anupam Jain, Indore</i>	<i>Rale Nikolic, Serbia</i>	
	<i>Bandi Shrenik, Indore</i>	<i>R C Dimri, Srinagar</i>	
	<i>Pragati Jain, Indore</i>	<i>Dhananjay Gopal, Surat</i>	
	<i>Venkteswara Pai, Pune</i>	<i>Anita Tomar, Uttarakhand</i>	
4:00 pm to 04:15 pm	TEA BREAK		
4:15 pm to 06:00 pm	TECHNICAL SESSION-2 (30 Min. Each) Session Chair: <i>Sumio Yamada, Japan</i>	PROF S. L. SINGH MEMORIAL SYMPOSIUM (20 Min. Each) Session Chair: <i>R. C. Dimri, Srinagar</i>	SESSION 1: Room A301 SYMPOSIUM : Conference Room
	<i>Malisa Zizovic, Serbia</i>	<i>U. C. Gairola, Uttarakhand</i>	
	<i>Nada Damljanovic, Serbia</i>	<i>Mamta Rani, Rajasthan</i>	
	<i>N. C. Chauhan, New V. V. Nagar</i>	<i>M. C. Joshi, Nainital</i>	
6:00 pm to 06:45 pm	EC MEETING, ISHM		Conference Room
6.45 pm to 07:00 pm	TEA BREAK		
07:00 pm to 08:00 pm	CULTURAL PROGRAM BY ICCR		ADIT Audi.
8:00 pm Onwards	DINNER		Near MBIT Canteen

18th December, 2019			
8:00 am to 9:00 am	TEA/BREAK FAST		Near MBIT Canteen
9:00 am to 11:00 am	PLANARY TALKS-2 (30 Min. Each) Session Chair: <i>Kim Plofker, USA</i>		Room No. A301
	<i>Norbert ACampo, Switzerland</i>		
	<i>Athanase Papadopoulos, France</i>		
	<i>Sumio Yamada, Japan</i>		
<i>M. S. Sriram, Chennai</i>			
11:00 am to 11:30 am	TEA BREAK		Near Room. A-301
11:30 am to 1:30 pm	TECHNICAL SESSION 3 : INVITED TALKS		
	SESSION 3A (30 Min. Each) Session Chair: <i>Anupam Jain, Indore</i>	SESSION 3B (20 Min. Each) Session Chair: <i>Rekha Mehta, V. V. Nagar</i>	
	<i>Medha S. Limaye, Mumbai</i>	<i>N. M. Patel, V. V. Nagar</i>	
	<i>S. A. Katre, Pune</i>	<i>B. L. Ghodadra, Baroda</i>	
	<i>J. C. Prajapati, V. V. Nagar</i>	<i>K. R. Trivedi, Bhavnagar</i>	
	<i>G. P. Pokhariyal, Kenya</i>	<i>Twinkle Singh, Surat</i>	
		<i>Priyanka Sharma, Gandhinagar</i>	
01:30 pm to 2:30 pm	LUNCH BREAK		Near MBIT Canteen
02:30 pm to 04:00 pm	TECHNICAL SESSION-4: INVITED TALKS		
	SESSION 4A (30 Min. Each) Session Chair: <i>Malisa Zizovic, Serbia</i>	SESSION 4B (20 Min. Each) Session Chair: <i>Satyanad Kichenassamy, France</i>	
	<i>Alena Zhukova, Russia</i>	<i>D. K. Gotkhindikar, Nashik</i>	
	<i>Krishnendu Gongopadhyay, Panjab</i>	<i>V. D. Pathak, Baroda</i>	
	<i>Jay Mehta, V. V. Nagar</i>	<i>A. H. Hasmani, V. V. Nagar</i>	
<i>Vipul R. Shah, V. V. Nagar</i>	<i>Shraddha Ingale, Ahmadnagar</i>		
04:00 pm to 04:15 pm	TEA		
04:15 pm to 06:45 pm	TECHNICAL SESSION 5-PAPER PRESENTATION		
	SESSION 5A	SESSION 5B	SESSION 5C
	Session Chair: Rale Nikolic, Serbia M 01 TO M 10 M 11 TO M 20 M 21 TO M 28	Session Chair: Nada Damljanovic, Serbia T 11 TO T 20 T 21 TO T 28	Session Chair: Malisa Zizovic, Serbia H 01 TO H 09
			SESSION 5A -A301 SESSION 5B-Conferene Room SESSION 5C- Language Lab
06:00 pm to 06:45pm	GENERAL BODY MEETING, ISHM		Conference Room
06:45 pm to 07:00pm	TEA		
07:00 pm to 08:00pm	CULTURAL PROGRAM BY STUDENTS		ADIT Audi.
8:00 pm Onwards	DINNER		Near MBIT Canteen

19th December, 2019			
8:00 am to 9:00 am	TEA/BREAK FAST		
9:00 am to 11:00 am.	PLANARY TALKS-3 (30 Min. Each) Session Chair: <i>S G Dani, Mumbai</i>		
	<i>Galina Sinkevich, Russia</i>		
	<i>Rekha Mehta, V. V. Nagar</i>		
	<i>K. Ramasubramanian, Mumbai</i>		
<i>H M Vasavada & H. M. Vasavada, V. V. Nagar</i>			
11:00 am to 11:15 am	TEA		
11:15 am to 01:15 pm	TECHNICAL SESSION-6: INVITED TALKS		
	SESSION 6A (30 Min. Each) Session Chair : <i>S.A. Katre, Pune</i>	SESSION 6B (20 Min. Each) Session Chair : <i>V D Pathak, Baroda</i>	
	<i>A. M. Vaidya, Ahmedabad</i>	<i>Chander Kant Sharma, Rajsthan</i>	
	<i>Omkarlal Shrivastav, Chattis Garh</i>	<i>Vishnu Narayan Mishra, M. P.</i>	
	<i>Parthsarathi Mukhopadhyay, Calcutta</i>	<i>Lakshmi Narayan Mishra, Tamilnadu</i>	
	<i>U. P. Acharya , New V. V. Nagar</i>	<i>Deena Sunil, M. P.</i>	
	<i>V. K. Chaudhari, H. P.</i>	<i>V. K, Muni, Karnatak</i>	
	<i>Dipak Jadav, M. P.</i>	<i>D. J. Prajapati, New V. V. Nagar</i>	
01:15 pm to 02:00 pm	LUNCH		
02:00 pm to 03:00 pm	TECHNICAL SESSION 7 - PAPER PRESENTATION		
	SESSION 7A	SESSION 7B:Students Session	SESSION 7C: Students Session
	Session Chair: Athanase Papadopoulos T 01 TO T 10	Session Chair: <i>A. M. Vaidya</i> Judges: <i>V. R. Shah</i> <i>A. H. Hasmani</i> <i>B. P. Patel</i> S 01 TO S 09	Session Chair: <i>M. H. Vasavada</i> Judges: <i>J. C. Prajapati</i> <i>Jay Mehta</i> <i>Shraddha Ingale</i> S 10 TO S 17
	<i>SESSION 7A Conf. SESSION 7B Lang. Lab SESSION 7C Room B- 205</i>		
03:00 pm to 04:00 pm	VALEDICTORY SESSION FOLLOWED BY TEA		
	<i>ADIT Audi.</i>		

This schedule is as per the following scheme:

1. FOR INVITED TALK - **30/20 minutes**/talk
2. FOR PPAER PRESENTATION - **5 minutes**/paper

The following model travel plan will be followed for delegates/participants accommodated in Guest Houses:

17-19 December 2019 : Morning

Departure : 8:00 am from respective Guest House

17-18 December, 2019 : Evening

Departure : 8:30 pm from MBIT to respective Guest House

IMPULSIVE AND DELAY CONTROL SYSTEMS: HISTORY, MATHEMATICAL ACHIEVEMENTS AND PERSPECTIVES

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Abstract

Here we present some of the mathematical milestones in the area of control theory with reference to impulsive and time-delay systems. To do this, we first overview the meaning of controllability, and the conditions for controllability such as Kalman's rank condition and PBH- rank condition. Then we discuss some of the domains of sciences and technologies where the impulses and time-delay arises and applies. This forces us to address the modeling issues of the systems involving impulses/delays. In order to give adequate formulation of the main questions, we introduce an elementary linear impulsive time-delay system and presented its controllability issues. The obtained controllability conditions are applied to the networked systems, and it is noticed that, in some of the networks, the individual systems are uncontrollable, but the whole network is controllable and vice-versa. This entire presentation is related to finite-dimensional systems on a continuous time-scale.

Keywords: Controllability, Impulsive systems, Time-delay systems, and Networked systems.

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AN INVENTORY MODEL WITH MAXIMUM LIFE TIME FOR NON-INSTANTANEOUS DETERIORATING ITEMS

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Abstract

This paper deals with the inventory model for non-instantaneous deteriorating Items. Here demand and sales revenue cost are taken to be time varying. Mostly, most of the proposed models researcher considered the constant deterioration rate but in actual situations, maximum items deteriorate due to finish of their maximum life time. The key idea integrated for the modeling of the proposed inventory model is: time-varying demand, time varying sales revenue, and sensitivity analysis of parameters with profit function. For getting the optimal total profit and the optimal order quantity, a numerical example is provided to demonstrate the practical usage of the mathematical result and sensitivity analysis of the optimal total profit function with respect to constraints is carried out.

Keywords: Inventory, non-instantaneous deteriorating items, maximum life time, time-varying demand and time-varying Sales revenue cost.



Charutar Vidya Mandal,
Vallabh Vidyanagar

ICHDMAST–2019

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