RAMANUJAN

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DEPARTMENT OF MATHEMATICES & STATISTICS

GOLAGHAT COMMERCE COLLEGE

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MESSAGE FROM HOD

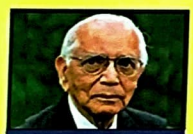
First of all I thank all students of B. Com 3rd Semester for helping us in publishing the fourth Volume of our Departmental Bulletin " Ramanujan".

Our Department is always trying to involve our students in different activities to make the subject "Mathematics" popular. But we still feel many students have 'mathophobia'. The term 'mathophobia' has been coined to describe the feeling of fear, tension, and anxiety about one's ability to do maths. This fear interferes with a child's ability to perform well in maths.To overcome the fear of maths-we must be positive, face the subject squarely, have to find out the root cause in case of any differently, enough practice, making the subject simple and fun, perceiving mathematics as a creative subject, applying it in our daily life, encouraging peer learning, giving good reasons to study mathematics etc.

I also take the opportunities to thank our Respected Principal Sir of our College herewith, who encourages us and helps us in all steps in all our departmental activities. I also thank Mrs Tulumoni Gogoi for her co-operation in publishing the Bulletin.

Dr. Karabi Devi

INDIAN MATHEMATICIAN



"C.R. Rao"

Akash shah
B.com 3rd Semester

Calyampudi Radhakrishna Rao known as an C.R. Rao was born on 10 September 1920. He was an Indian – American Mathematician and and Statistician. He is currently professor emeritus at Pennsylvania State University and Research Professor at the University at Buffalo. He has been honoured by numerous Colligula, honorary degrees and Festschrifts and was awarded the US National Medal of Science in 2002. The American Statistical Association has described him as "a living legend" whose work has influenced not just statistics, but has had for reaching implications for field as varied as economics, genetics, anthropology, geology, national planning, demography, biometry, and medicine. He is known for Cramer-Rao bound, Rao-Blackwell theorem,Orthoganal arrays score test. He has achieved Padma Vibhushan National Medal of Science (2001), S.S Bhatnagar Prize Guy Medal (silver 1965, gold 2011). His thesis was Statistical Problems of Biological Classifications (1948).

SUMMATION OF SIGMA NOTATION

Ruprekha Saikia
B.com 3rd Semester

In eighteenth century, German Mathematician Leonhard Euler introduced the capital Greek letter Sigma, Σ to denote a summation. Summation is the addition of a sequence of any kind of numbers, called addends or summands; the result is their sum or total. Summation is an elementary mathematical operation. At higher educational levels, the sigma sign is used to represent and carryout more complex summations.Thesigma is always combined with another symbol representing the quantities to be added. Sigma Notations or Sigma is often used to describe sums of combinations of variables, linked by a common label, such as

$$\sum_{i=3}^{n} x_i y_i = x_1 y_1 + x_2 y_2 + x_3 y_3$$

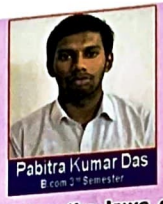
"I'm sick of all these conferences. I always say the same things over and over!" The driver agrees: "You're right. As your driver, I attended all of them, and even though I don't know anything about science, I could give the conference in your place."

- Albert Einstein

"That's a great idea!" says Einstein. "Let's switch places then!" So they switch clothes and as soon as they arrive, the driver dressed as Einstein goes on stage and starts giving the usual speech, while the real Einstein, dressed as the car driver, attends it.

- Albert Einstein

ASTROPHYSICS



Pabitra Kumar Das
B.com 3rd Semester

Astrophysics is a branch of space science that applies the laws of physics and chemistry to seek to understand the universe and our place in it. The field explores topics such as the birth, life and death of stars, planets, galaxies, nebulae and other objects in the universe.

While astronomy is one of the oldest sciences, theoretical astrophysics began with Isaac Newton. It can therefore be argued that Newton was the first astrophysicist, using the mathematical and physical tools he himself developed to ask questions about the nature of physical processes in the cosmos.

Prior to Newton, astronomers described the motions of "heavenly bodies," as they were then called, using complex mathematical models without a physical basis. Newton showed that a single theory, describing what we now know as gravity, simultaneously explains the orbits of moons and planets in space and the trajectory of a cannonball on Earth. This added to the body of evidence for the (then) startling conclusion that the "heavens" and Earth are subject to the same physical laws. Perhaps what most separated Newton's model from previous concepts, however, is that his theory was predictive as well as descriptive. Based on aberrations in the orbit of Uranus, astronomers predicted the position of a new planet, which was then observed and named Neptune. But the most important realization to emerge from Newton's era was simply that the universe is governed by physical processes. Given the right tools, these processes can be understood by humans. No longer did the universe obey the whims of mystical and unfathomable powers: what was out there was just physics.

In the 20th century, Albert Einstein initiated a new revolution in our understanding of gravity with his general theory of relativity. Now it's estimated that what we know about the cosmos is doubling every 10 years.A large part of that knowledge comes from the continued contribution of astrophysicists to our understanding of the laws of nature at work in the universe. Einstein in 1947, at the age of 68. His special and General theories of relativity altered the way astrophysicists think about space, matter and time.

Observational astronomy:

Observational astronomy is a division of the astronomical science that is concerned with recording and interpreting data, in contrast with theoretical astrophysics, which is mainly concerned with finding out the measurable implications of physical models. It is the practice of observing celestial objects by using telescopes and other astronomical apparatus. The majority of astrophysical observations are made using the electromagnetic spectrum.

ICAI

Esshan Nandy
B.com 3rd Semester

ICAI stands for the Institute of Chartered Accountants of India. It was established in 1st July, 1949. Its headquarter is situated at New Delhi. Its regional offices are situated at New Delhi, Mumbai, Kolkata, Chennai and Kanpur. It has 157 branches in India. ICAI was established as a statutory body under the Chartered Accountants Act,1949 enacted by the Parliament to regulate the profession of Chartered Accountancy in India. It recommends the accounting standards to be followed by Companies in India to The National Financial Reporting Authority (NFRA) and sets the accounting standards to be followed by other types of organisations. ICAI is solely responsible for setting the auditing and assurance standards to be followed in the audit and financial statements in India. It works closely with the Government of India, Reserve Bank of India and Securities and Exchange Board of India.

Indian Chartered Accountancy Course:

The Chartered Accountancy examinations are divided into three basic subjects –

Common Proficiency Test: The CPT covers 4 basic subjects-

- Fundamentals of Accounting
- Mercantile Laws
- Economics
- Quantitative Aptitude.

One can register for CPT after completing 10th grade and take the exam after completing 12th grade. CPT exams are held in June and December. A candidate is considered to have cleared CPT if he/ she obtains in a sitting 30% in ech of the 4 sections and a 50% aggregate in the entire examination.

Integrated Professional Competence Course (IPCC):

The IPCC is the second level of CA examinations. A person can take IPCC exam after passing CPT and nine months of study. IPCC has two groups of seven subjects. Group I includes Accounting, Business Law; Ethics and Communication, Cost Accounting and Financial Management and Taxation. Group II includes Advance Accounting, Auditing and Assurance, Information Technology and Strategic Management.

A passing grade in IPCC is awarded if the candidate obtains 40% marks in each subject and an aggregate of 50% in the aggregate in each group. Benefit of set-off is also available if the candidate appears for both groups together and obtains 50% collectively in both groups, even if he/ she fails to obtains an individual aggregate of 50% in the each group independently.

CA Final Examination:

The CA Final exam is the last and the final level of CA. It is considered as one of the toughest exam in the world. Any person who has passed both the groups of IPCC, during the last six months of the articleship can take the final examination. The exam consists of two groups of four subjects each.

Group I includes Financial reporting, Strategic Financial Management, Advanced Auditing and Professional Ethics, Corporate and Allied Laws.

Group II includes Advanced Management Accounting, Information System Council and Audit, Direct Tax Laws and Indirect Tax Law.

The passing grade for this exam is the same as the second level i.e. IPCC as mentioned earlier IPCC and CA Final Examination are conducted in May and November. After passing the CA Final, one can get the membership of ICAI and recognized as CA.

WOMEN IN MATHEMATICS

Kajal Shah
B.com 3rd Semester

There are many women known for their contributions to mathematics. The woman in mathematics that I chose was Suzan Rosa Benedict. Suzan was born in Norwalk, Ohio in 1873. She received her B.A. degree in 1895 from Smith College with a major in chemistry and a minor in Mathematics, German, and physics.

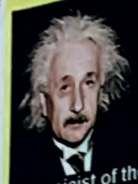
Suzan taught high school mathematics in Norwalk from 1895 to 1905 while also working as a real estate agent. She then entered Columbia University, receiving her master's degree in the history of Mathematics in 1906. In the same year she started teaching mathematics at Smith College and where she remained for the rest of her professional career.

Suzan continued her graduate studies while teaching, and in 1914 she became the first woman to receive a PhD in Mathematics from the University of Michigan. At Smith College Suzan continued her research in the history of Mathematics, publishing papers in the Mathematics Teacher the American Mathematical Monthly. Through her efforts the Smith College library developed a large collection of rare books on the history of mathematics. She was promoted to the rank of Professor in 1921. Benedict was also a charter member of the Mathematical Association of America, founded in 1915.

Benedict retired from Smith in February, 1942.She died from a heart attack two months later. Her friendliness was not confined to the College. To her an acquaintance was a friend and people of all sorts and conditions in the town felt that they knew her and will miss her.

ALBERT EINSTEIN

Biplov kumar
B.com 3rd Semester



Albert Einstein, (born March 14, 1879, Ulm, Württemberg, Germany—died April 18, 1955, Princeton, New Jersey, U.S.), German-born physicist who developed the special and general theories of relativity and won the Nobel Prize for Physics in 1921 for his explanation of the photoelectric effect. Einstein is generally considered the most influential physicist of the 20th century.

In 1900, Einstein faced one of the greatest crises in his life. Because he studied advanced subjects on his own, he often cut classes; this earned him the animosity of some professors, especially Heinrich Weber. Unfortunately, Einstein asked Weber for a letter of recommendation. Einstein was subsequently turned down for every academic position that he applied to.

In January 1902 he and Maric even had a child, Lieserl, whose fate is unknown. (It is commonly thought that she died of scarlet fever or was given up for adoption.)

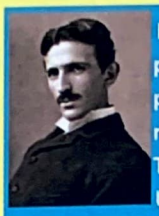
In 1902 Einstein reached perhaps the lowest point in his life. He could not marry Maric and support a family without a job, and his father's business went bankrupt.The turning point came later that year, when the father of his lifelong friend Marcel Grossmann was able to recommend him for a position as a clerk in the Swiss patent office in Bern.

With a small but steady income for the first time, Einstein felt confident enough to marry Maric, which he did on January 6, 1903. Their children, Hans Albert and Eduard, were born in Bern in 1904 and 1910, respectively. In hindsight, Einstein's job at the patent office was a blessing.

During 1905, often called Einstein's "miracle year," he published four papers in the Annalen der Physik . Einstein also submitted a paper in 1905 for his doctorate.

NIKOLA TESLA

Ankita Paul
B.com 3rd Semester



Nikola Tesla was born in 1856 in Smiljan, Croatia, then part of the Austro-Hungarian Empire. His father was a priest in the Serbian Orthodox church and his mother managed the family's farm.

Tesla studied math and physics at the Technical University of Graz and philosophy at the University of Prague. In 1882, while on a walk, he came up with the idea for a brushless AC motor, making the first sketches of its rotating electromagnets in the sand of the path. Later that year he moved to Paris and got a job repairing direct current (DC) power plants with the Continental Edison Company. Two years later he immigrated to the United States.

"I am convinced that I can today send a message to a ship at ses, and that those en board can understand it. if i can not. I am willing to lay my head on the guillotine."

It was Nikola Tesla who made the above strange remark, and his wonder ful achievements in the development of electrical science make his words worthy of respectful con sideration. He has already estab lished the fact that but one wire is necessary to create an electric al current and is now engaged on the problem of transmitting a current without the use of a wire at all. That he NIKOLA TESLA has grati secret of how this may ultimately be ac complished some of the experiments ex hibited at his public lectures would seem to demonstrate.

He died in 7 January 1943 at New York.

Jyoti Rani Ghosh
B.com 3rd Semester

Infinity is that which is boundless, endless or larger than any natural number. It is often denoted by the infinity Symbol.

Since the time of ancient of the ancient Creeks, the philosophical nature of infinity was the subject of many discussions among Philosophers. In the 17th century, with the introduction of the Infinitysymbol and the infinitesmial Calculus. mathematicians began to work with infinite series and what some mathematicians regarded as infinitely small quantities but infinity continued to be associated with endless processes.

As mathematic and struggled with the foundation of calculus. It remained unclear whether infinity could be considered as a number or magnitude and if so, how this could be done. At the end of the 19th century, Georg Cantor enlarged the mathematical study of infinity by studying infinite numbers showing they Can be of various sizes.

Mathematics:

Mathematics is the science of the Infinite.

Symbol:

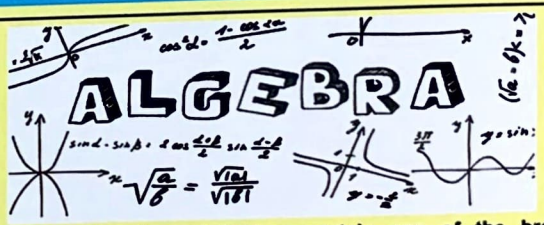
The Infinity symbol (lemniscate) is a mathematical symbol representing the concept of infinity. The symbol is encoded is Unicode at U+221E Infinity.

Calculus:

Gottfried Leibniz one of the co-inventors of Infinitesimal calculus, speculated widely about infinite numbers and their use in mathematics.

Infinite dimension:

The vector spaces that occurs in classical geometry have always a finite dimension generally two or three. However this is not implied by the abstract definition of a vector Spaces of infinite dimension can be considered.



Pradyut Kakoty
B.com 3rd Semester

Algebra 'reunion of broken partsis one of the broad areas of mathematics. Roughly speaking, algebra is the study of mathematical symbols and the rules for manipulating these symbols in formulas; it is a unifying thread of almost all of mathematics

The quadratic formula expresses the solution of the equation ax2 + bx + c = 0, where a is not zero, in terms of its coefficients a, b and c.

Elementary algebra deals with the manipulation of variables as if they were numbers (see the image), and is therefore essential in all applications of mathematics. Abstract algebra is the name given in education to the study of algebraic structures such as groups, rings, and fields. Linear algebra, which deals with linear equations and linear mappings, is used for modern presentations of geometry, and has many practical applications (in weather forecasting, for example). There are many areas of mathematics that belong to algebra, some having "algebra" in their name, such as commutative algebra and some not, such as Galois theory.

The word algebra is not only used for naming an area of mathematics and some subareas; it is also used for naming some sorts of algebraic structures, such as an algebra over a field, commonly called an algebra. Sometimes, the same phrase is used for a subarea and its main algebraic structures; for example, Boolean algebra and a Boolean algebra. A mathematician specialized in algebra is called an algebraist. The word "algebra" has several related meanings in mathematics, as a single word or with qualifiers.

As a single word without an article, "algebra" names a broad part of mathematics. The word "algebra" has several related meanings in mathematics, as a single word or with qualifiers.

As a single word without an article, "algebra" names a broad part of mathematics.

ZERO

Pranjit saikia
B.com 3rd Semester

Our understanding of zero is profound when we consider this fact. We don't often, or perhaps ever , encounter zero in nature . Number like One , Two and Three have a counter part. But zero? It requires us to recognize that the absence of something is a thing in and of itself. Zero is in the mind, but not in the sensory world, perhaps a true zero – meaning absolute nothingness may have existed in the time before the big bang. But we can never know.

Once we had zero, we have negative numbers. Zero helps us understand that we can use math to think about things that have no counter part in a physical lived experience ; imaginary number don't exist but are crucial to understanding electrical systems. Zero also helps us understand it's antithesis , infinity , in all of its extreme weirdness. Nevertheless , zero doesnit have to exist to be useful. In fact, we can use the concept of zero to derive all the other number in the universe.

DIFFERENTIAL GEOMETRY

Anikesh Das
B.com 3rd Semester

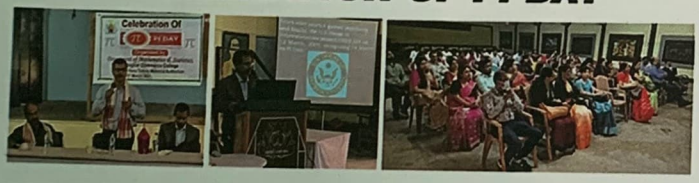
Differential geometry is a mathematical discipline that studies the geometry of smooth shapes and smooth spaces, otherwise known as smooth manifolds. It uses the techniques of differential calculus, integral calculus, linear algebra and multilinear algebra. The field has its origins in the study of spherical geometry as far back as antiquity. It also relates to astronomy, the geodesy of the Earth, and later the study of hyperbolic geometry by Lobachevsky. The simplest examples of smooth spaces are the plane and space curves and surfaces in the three-dimensional Euclidean space, and the study of these shapes formed the basis for development of modern differential geometry during the 18th century and the 19th century.

Since the late 19th century, differential geometry has grown into a field concerned more generally with geometric structures on differentiable manifolds. A geometric structure is one which defines some notion of size, distance, shape, volume, or other rigidifying structure. For example, in Riemannian geometry distances and angles are specified, in symplectic geometry volumes may be computed, in conformal geometry only angles are specified, and in gauge theory certain fields are given over the space. Differential geometry is closely related to, and is sometimes taken to include, differential topology, which concerns itself with properties of differentiable manifolds which do not rely on any additional geometric structure (see that article for more discussion on the distinction between the two subjects). Differential geometry is also related to the geometric aspects of the theory of differential equations, otherwise known as geometric analysis.

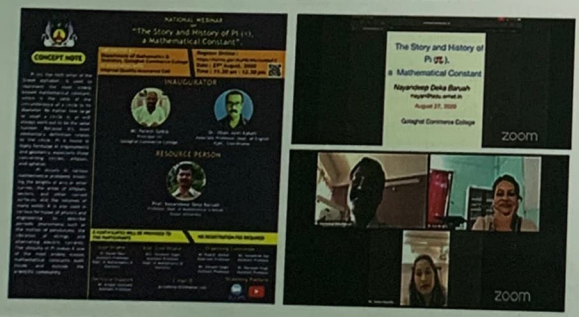
Differential geometry finds applications throughout mathematics and the natural sciences. Most prominently the language of differential geometry was used by Albert Einstein in his theory of general relativity, and subsequently by physicists in the development of quantum field theory and the standard model of particle physics. Outside of physics, differential geometry finds applications in chemistry, economics, engineering, control theory, computer graphics and computer vision, and recently in machine learning.

ACTIVITIES OF THE DEPARTMENT

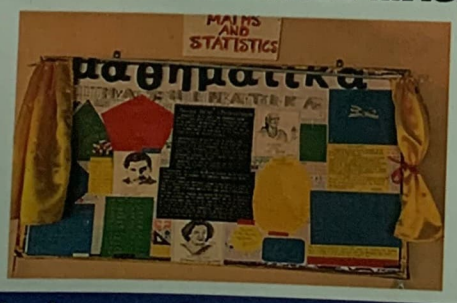
CELEBRATION OF PI DAY



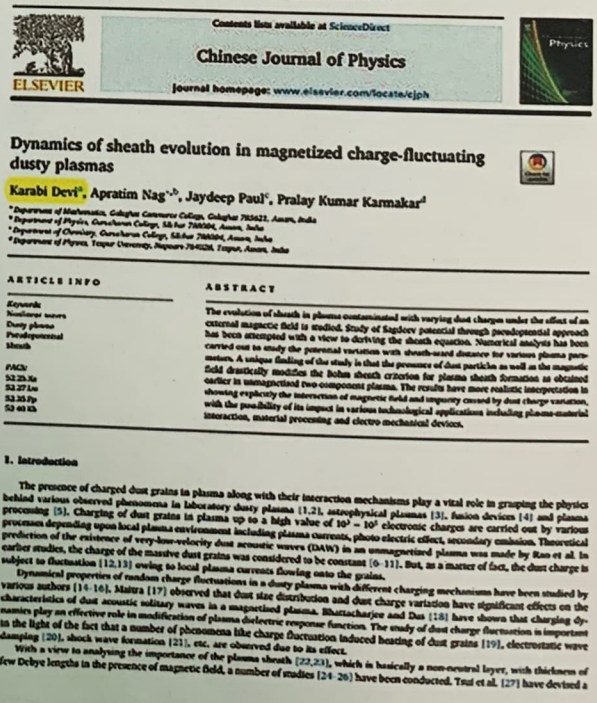
NATIONAL WEBINAR ON "THE STORY AND HISTORY OF PI, A MATHEMATICAL CONSTANT "



DEPARTMENTAL WALL MAGAZINE



PUBLICATION



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ELSEVIER

Physics

Dynamics of sheath evolution in magnetized charge-fluctuating dusty plasmas

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ABSTRACT

The evolution of sheath in plasma contaminated with varying dust charges under the effect of an external magnetic field is studied. Study of Sagdeev potential through pseudopotential approach has been attempted with a view to deriving the sheath equation. Numerical analysis has been carried out to study the potential variation with sheath-ward distance for various plasma parameters. A unique finding of the study is that the presence of dust particles as well as the magnetic field drastically modifies the Bohm sheath criterion for plasma sheath formation as obtained earlier in unmagnetized two-component plasma. The results have more realistic interpretation in showing explicitly the intersection of magnetic field and impurity caused by dust charge variation, with the possibility of its impact in various technological applications including plasma-material interaction, material processing and electro-mechanical devices.

1. Introduction

The presence of charged dust grains in plasma along with their interaction mechanisms play a vital role in grasping the physics behind various observed phenomena in laboratory dusty plasma [1,2], astrophysical plasmas [3], fusion devices [4] and plasma processing [5]. Charging of dust grains in plasma up to a high value of $10^3 - 10^5$ electronic charges are carried out by various processes depending upon local plasma environment including plasma currents, photo electric effect, secondary emission. Theoretical prediction of the existence of very-low-velocity dust acoustic waves (DAW) in an unmagnetized plasma was made by Rao et al. In earlier studies, the charge of the massive dust grains was considered to be constant [6–11]. But, as a matter of fact, the dust charge is subject to fluctuation [12,13] owing to local plasma currents flowing onto the grains.

Dynamical properties of random charge fluctuations in a dusty plasma with different charging mechanisms have been studied by various authors [14–16]. Maitra [17] observed that dust size distribution and dust charge variation have significant effects on the characteristics of dust acoustic solitary waves in a magnetized plasma. Bhattacharjee and Das [18] have shown that charging dynamics play an effective role in modification of plasma dielectric response function. The study of dust charge fluctuation is important in the light of the fact that a number of phenomena like charge fluctuation induced heating of dust grains [19], electrostatic wave damping [20], shock wave formation [21], etc. are observed due to its effect.

With a view to analysing the importance of the plasma sheath [22,23], which is basically a non-neutral layer, with thickness of few Debye lengths in the presence of magnetic field, a number of studies [24–26] have been conducted. Tsui et al. [27] have devised a

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