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The Proof of The Riemann Hypothesis

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Abstract—The proof of the Riemann Hypothesis is presented in three different ways in this paper. By using One of the Euler's Equation, some Matrices representations of the Riemann Zeta Equation are derived and through Fourier transformation of the Meromorphic Equation, an equivalent Equation for $\varepsilon(t)$, the analytic continuation formula of the Riemann Zeta Equation, is obtained.

The Hilbert-Poly Conjecture and the Berry-Keating Conjecture as it applies to quantum mechanics, are investigated and shown to be true through the representation of the obtained matrices as $H_{cl} = XP$,where X and P are position (one of the Pauli Spin Matrices) and momentum Matrices respectively, for $\zeta(z)$ and $\varepsilon(t)$.

A new representation of the Integral component of the $\zeta(z)$ is derived and the connecting link between the Riemann Zeta Function and the work of A.Selberg (1956), for which he won Wolf Prize in mathematics on; Harmonic analysis and discontinuous groups in weakly symmetric Riemannian spaces with applications to Dirichlet series is shown to be a generator of the imaginary components of the non-trivial zeros of the Riemann zeta function. The connections between the zeros of the Riemann zeta function, the prime and celestial Merida are also discussed.

Keywords: *Riemann Hypothesis; Euler's equation; Fourier series; Meromorphic Function. quantum mechanics; position/momentum matrices; Dirichlet series; Prime/Celestial Merida.*

Data Compression and Data Classification

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Abstract— Clustering by compression is a powerful tool that uses compression information to classify digital objects and that does not rely on any knowledge or theoretical analysis on the problem domain but only on general-purpose compression techniques. In this paper we review the clustering by compression approach and show some testing results we have obtained.

Keywords—data compression, clustering, classification.

Some optimal control problems of hydrodynamic processes

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Abstract—The problem of optimal control of the movement of ideal incompressible fluid with a free surface in the vessel of various geometric shapes(cubic, cylindrical, etc.) has been considered .In the case of potential flow of fluid elliptic boundary value problem with a free boundary for determining the velocity potential of the field has been obtained while at the borders, which are constant in time the natural conditions of impermeability are valid and on the free surface two nonlinear terms, that bind the potential velocity field with the form of the free surface are true, to turn from the problem with a free (unknown) boundary to the problem with the fixed conditions have been demolished on the equilibrium surface (under the natural assumption of the free surface oscillations).The solution of this problem has been obtained in the form of a double Fourier series, the basis functions of which depend on the shape of the vessel, which examines the flow of liquid, and the coefficients are functions of time. The control functions are forces, which affect the vessel with liquid along the axes. The problem was to affect the vessel with the forces, to repay fluctuations at the current time. In other words the task was to solve the optimal control problem with terminal functionality. The solution of this problem was found with the help of L.S. Pontryagn's maximum principle.

Keywords: optimal control, hydrodynamics, the Pontryagin maximum principle..

Riemann Hypothesis Proof

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ABSTRACT:

The Riemann zeta function $\zeta(s)$ is a function whose argument s may be any complex number other than 1, and whose values are also complex. It has zeros at the negative even integers; that is, $\zeta(s) = 0$ when s is one of $-2, -4, -6, \ldots$. These are called its trivial zeros. However, the negative even integers are not the only values for which the zeta function is zero. The other ones are called *non-trivial zeros*. The Riemann hypothesis is concerned with the locations of these non-trivial zeros, The real part of every non-trivial zero of the Riemann zeta function is 1/2.

$$\zeta(s) = \begin{cases} \displaystyle\sum_{n=1}^{\infty} \frac{1}{n^s} & \Re(s) > 1 \\ \displaystyle\frac{1}{s-1} + \sum_{n=1}^{\infty} \int_n^{n+1} \left(\frac{1}{n^s} - \frac{1}{x^s} \right) dx & 0 < \Re(s) \le 1 \\ \displaystyle 2^s \pi^{s-1} \cos\frac{\pi(1-s)}{2} \Gamma(1-s) \zeta(1-s) & \Re(s) < 0 \end{cases}$$

- $\zeta(s)$ has "trivial" zeros at the negative even integers $\{-2, -4, -6, \ldots\}$.
- $\zeta(s)$ has zeros in the critical strip $0 < \Re(s) \le 1$, which are symmetric about the line $\Re(s) = \frac{1}{2}$.
- Riemann believed all zeros are on the line $\Re(s) = \frac{1}{2}$.

The Riemann hypothesis proof is demonstrated in a simple way. In this paper Zeta function connected with the distribution of prime numbers. This paper presents laws and simple ways to find all the prime numbers. Finding of prime factors for a semi-prime.

Keywords : Riemann zeta function , Primes , Euler's equation , Complex number , Graphs of trig functions .

References :

[1] Official Problem Description With Links to Riemann's paper by Clay Mathematics Institute . http://WWW.claymath.org/millenium/problems/Riemann hypohesis

.[2] Brent, Richard P. "On the Zeros of the Riemann Zeta Function in the Critical Strip." Mathematics of Computation 33.148 (1979): 1361. Print.

[3] Edwards, Harold M. Riemann's Zeta Function. New York: Academic, 1974. Print.

[4] Hutchinson, J. I. "On the Roots of the Riemann Zeta Function." Transactions of the American Mathematical Society 27.1 (1925): 49. Print.

[5] Lehmer, D. H. "Extended Computation of the Riemann Zeta-function." Mathematika 3.02 (1956): 102. Print.

[6] Lehmer, D. H. "On the Roots of the Riemann Zeta-function." Acta Mathematica 95.1 (1956): 291-98. Print.

[7] G. E. Andrews, R. Askey e R. Roy. Special Functions. Cambridge University Press, 2001.

[8] R. Stone. Generalised Cesaro Convergence, Root Identities and the Riemann Hypothesis. arXiv.1111.1951v1 [math.NT] 7 Nov 2011

Recursive Reed–Solomon Codes for Distributed Storage Systems

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The methods and algorithms of data preservation are among the most important problems of computer science. In order to make data error-resilient one has to introduce additional redundancy into it. The distributed storage systems use two types of redundancy, namely replication and erasure coding. The replication methods store multiple copies of the initial data, consuming large amounts of disk space. The erasure codes represent initial data in the form of data blocks and produce extra parity blocks to achieve specified level of error tolerance. The most known and used erasure codes are Reed–Solomon codes. These codes are optimal in sense that they generate the minimum number of parity blocks using finite field arithmetic operations. However, Galois algebra is computation-expensive, meaning that Reed–Solomon codes save disk space at the cost of processing power. In practice the number of tolerable erasures is also limited by computation costs.

We propose the algorithmic modification of Reed–Solomon erasure codes that recursively process each resulting block increasing the error tolerance without driving the required processing power to unreasonable levels. This hierarchical algorithm saves processing power at the cost of optimality of original one-stage Reed–Solomon codes, since the resulting blocks are not equivalent to the outcome of their erasure. However, this complication can be mitigated by policies of block placement across the disks of a storage.

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Reliability Estimation for Distributed Storage Systems with Explicit Disk Failures and Latent Errors

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In this paper we present a numerical model to simulate HDD failures in distributed storage systems of large scale. The modern storages of petabyte capacity consist of thousands of disks that are statistically exposed to failures on a regular basis. In order to preserve deposited data the computer systems rely on redundancy either in the form of replication schemes either in the form of erasure correction codes. The first option arranges the copies of data block on multiple servers, correspondingly increasing allocated capacity many-fold. The second option partitions each data block into sequence of fragments, computes additional parity fragments via erasure codes and distributes the result across various servers. The second approach to data reliability requires less capacity but demands computational power to carry out encoding/decoding procedures. Generally, the failure and recovery processes are quite complex, so the analytical solutions for system reliability have strict assumptions and very limited applicability. Thus, the proposed mathematical model allows one to estimate main reliability indicator — time to data loss (MTTDL) — and reveal its dependency on various patterns of fragment placement across the cluster. The simulations reveal that for the equal number of storage nodes the special patterns accounting for locality groups and failure domains (server, rack, group of racks) are superior to random distribution of fragments. The same results were observed for the case of correlated disk failures.

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The Convergence of the Riemann Zeta Power Tower Function

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Abstract— Over a century and half has passed when Bernhard Riemann hypothesized that the non-trivial roots of the Riemann zeta function $\zeta(s)$ all lie on the half-line $s = \frac{1}{2} + i\sigma$.

In this paper the Zeta-function is iterated as a power tower and its properties are applied as an approach to an indication that the Riemann hypothesis might be true. It is known that complex valued Power towers converge under certain conditions to exponential power towers of entire functions. These properties can be used to resolve the Riemann Hypothesis. Combining the properties of Power towers and the Ramanujan Master theorem shows that the Riemann Zeta function converges to exponential functions only on the half-line.

Keywords—Riemann Hypothesis, Ramanujan, Master Theorem, Zeta, Power Towers, Convergence, Exponential Iterations.

Lossless Image Compression Using Quadtree Algorithm

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Abstract— In this paper, we propose a new approach for lossless image compression based on Quad-tree algorithm. Our approach, similar embedded zero block coding (EZBC), using quadtree and prediction context, when RWT (reversible wavelet transform) is employed for subband transform.

This approach can produce results compression ratio from lossless image compression obtained by our approach are batter compared with all image test used with recent approaches such asJPEG 2000 and CALIC algorithms.

Keywords— Image compression, Quadtree, EZBC, Predition, Entropy, Coding, Compression ratio,JPEG2000, CALIC

A Comparative Study and Simulation on S-P Networks and Feistel Structures

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***Abstract*—**Information security is such a discussed topic in wide range of organizations and institutions. Cryptography is a science that focuses on creating new algorithms, improving the existing ones and studying the basic underlying transformations and different structures to protect data in native form or encrypted one. Explosive growth in computer systems and their interconnections via networks has increased the dependence of both the organizations and individuals on the information stored and communicated. This in turn has led to an awareness of the need to protect data and resources from disclosure, to guarantee the authenticity of data and messages and to protect systems from network based attacks. There are more complex networks nowadays and there is so important to use protocols, cryptographic mechanisms or more efficient applied methods. Encryption algorithms are very wide spread but it is worth to estimate the strength of a certain scheme. Algorithms are implied with data security either in storage mediums or in communication. There are a lot of cases when cryptography becomes useful such in protocols, certificates, software and hardware. They may be combined according to their strength and in this paper is given an estimate about the performance of the algorithms; the key features of each of them and improving a specific algorithm to increase its security. There are a lot of changes in cryptography; from simple ciphers to modern algorithms; from basic calculations to machine computations and according to key distribution there are special achievements due to quantum computing. Two basic transformations: Substitution and Permutation combined with other operations such as XOR and non-linear functions are present continuously in several algorithms. These two transformation deal with Claude Shannon well-known two principles: Confusion and Diffusion. The former is about analyzing the interdependence between plaintext and ciphertext and the latter is about measuring the influence over the bits in ciphertext after a bit change occurs in plaintext. These transformations can be repeated in a number of rounds to measure the scalability features of an algorithm and to evaluate the overall performance.

Keyword *— Symmetric; Asymmetric; S-P Networks; Feistel Structure; Scalability.*

Process Analysis of Simplex Method

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***Abstract*—**Simplex method is one of popular ap- proaches to find an optimal solution of a linear pro- gramming problem such as maximum profit or low cost. Although this method has been widely used but only some groups of people can penetrate the detail of the logic of the process. Reasonably understanding the development can help researchers to establish a new ap- proach corresponding to advanced and recent problems. The aim of this work is to review the simplex method so that ones can instantaneously learn the method without opening hundred pages of a linear programming book and review various terminologies and theorems before they can get to the simplex method section. We also complete some mathematical aspects of the procedure that have not formulated in the books so that one can easily and deeply understand the method. The process to obtain the conditions used in the Dantzig's simplex method to have an optimal solution of the minimization problem, which can be modified for the maximization one, is presented and we also provide an example to fulfill the completeness.

Keywords*–Linear Programming; Minimization problem; Optimization example*