

Number theory : our results in English language

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Gruppo Eratostene

Abstract

In this paper we show some articles concerning our results in Number Theory, to read on our web site www.gruppoeratostene.com

1) **“Goldbach, Twin Primes and Polignac Equivalent RH”**

eng. Rosario Turco, prof. Maria Colonnese, Dr. Michele Nardelli, prof. Giovanni Di Maria, Francesco Di Noto, prof. Annarita Tulumello

Abstract

In this work the authors will explain and prove three equivalent RH, which are obtained linking $G(N)/N$ with Li and $g(N)/N$ with Li . Moreover the authors will show a new step function for $G(N)/N$ and, through the GRH, a generalization for Polignac. The authors thank all readers, if they will return a feedback on this paper

(in the section “Articoli su Goldbach”)

.2) **“FACTORING PATH GENERALIZED ALGORITHM WITH PERFECT SQUARES WITHIN PRECINCTS OF $6k \pm 1$ FORMS”**

Eng. Rosario Turco, Dr Michele Nardelli, Prof. Giovanni Di Maria, P.a. Francesco Di Noto, Prof. Annarita Tulumello, Prof. Maria Colonnese.

ABSTRACT

This article is a further study of previous work Primality test, Factoring and (N) with $6k \pm 1$ forms (see reference [1]). Present work shows as, within precincts factoring with $6k \pm 1$ forms, we can introduce a generalized algorithm to confront all types of perfect squares: Pythagorean s triads, perfect squares for number with distance 2 (both twin prime numbers and not ones) or perfect squares with a greater distance of 2. In this occasion, we insert a new theorem on this argument, that permits to solve, with an efficient algorithm, the problem.

(in the section “Articoli sulla Fattorizzazione”)

3) “Proposal Demonstration of Andrica’s Conjecture”

Rosario Turco, Maria Colonnese, Giovanni Di Maria, Francesco Di Noto, Michele Nardelli, Annarita Tulumello

Abstract

In this paper we will show our short proof of Andrica’s conjecture...using some of our results on Legendre’s conjecture ([2]). In appendix also an algorithm in PARI/GP to search for counter-examples in a numeric range

4) “The Landau’s prime numbers and the Legendre’s conjecture”

eng. Rosario Turco, prof. Maria Colonnese, Dr. Michele Nardelli, prof. Giovanni Di Maria, Francesco Di Noto, prof. Annarita Tulumello

Abstract

In this work the authors will explain and prove an equivalent RH which is linked to the Landau’s prime numbers and discuss on the Legendre’s conjecture and on the infinity of Landau’s prime numbers

(in the section “Articoli sui numeri primi”)

5) On the Riemann Hypothesis

The conjecture The non-trivial zeros of Riemann’s zeta have all multiplicity 1 is true!

eng. Rosario Turco, prof. Maria Colonnese on the database CNR Solar (ITALY)

Abstract

In this work the authors prove the conjecture.

(in the section “Articoli sui Problemi del Millennio”)

6) “The Fibonacci’s zeta function. Mathematical connections with some sectors of String Theory”

Michele Nardelli and Rosario Turco. Dipartimento di Matematica ed Applicazioni “R. Caccioppoli” Università degli Studi di Napoli “Federico II” – Polo delle Scienze e delle Tecnologie Monte S. Angelo, Via Cintia (Fuorigrotta), 80126 Napoli, Italy

Abstract

In this paper we have described, in the **Section 1**, the Fibonacci’s zeta function and the Euler-Mascheroni constant and in the **Section 2**, we have described some sectors of the string theory: zeta strings, zeta nonlocal scalar fields and some Lagrangians with zeta Function nonlocality. In conclusion, in the **Section 3**, we have described some possible mathematical connections.

(in the section “Articoli di Fisica – Matematica”)

7) “The Fermat Last Theorem”: a possible algebraic proof.

Mathematical connections with string theory

Rosario Turco, Maria Colonnese, Michele Nardelli. Dipartimento di Scienze della Terra Università degli Studi di Napoli Federico II, Largo S. Marcellino, 10 80138 Napoli, Italy 2. Dipartimento di Matematica ed Applicazioni “R. Caccioppoli” Università degli Studi di Napoli “Federico II” – Polo delle Scienze e delle Tecnologie Monte S. Angelo, Via Cintia (Fuorigrotta), 80126 Napoli, Italy

Abstract

In this paper, we have described in the Section 1, the Binomial Coefficient, in the Section 2, the Binomial Theorem and, in the Section 3, the Pitagora’s Theorem with algebraic method and with a trigonometric proof. In the Section 4, we describe an algebraic proof of the Fermat Last Theorem (FLT). In the Section 5, we have described some equations and theorems concerning the Wiles’s proof of FLT. In the Sections 6, 7 and 8 we have described some equations concerning the p-adic, adelic strings and zeta strings. In conclusion, in the Section 9, we have describes some possible mathematical connections.

(in the section “Articoli di Fisica – Matematica”)

8) “The Circle’s Method to investigate the Goldbach’s Conjecture and the Germain primes: Mathematical connections with the p-adic strings and the zeta strings”.

Michele Nardelli e Rosario Turco. Dipartimento di Scienze della Terra Università degli Studi di Napoli Federico II, Largo S. Marcellino, 10 80138 Napoli, Italy 2. Dipartimento di Matematica ed Applicazioni “R. Caccioppoli” Università degli Studi di Napoli “Federico II” – Polo delle Scienze e delle Tecnologie Monte S. Angelo, Via Cintia (Fuorigrotta), 80126 Napoli, Italy

Abstract

In this paper we have described in the Section 1 some equations and theorems concerning the Circle Method applied to the Goldbach’s Conjecture. In the Section 2, we have described some equations and theorems concerning the Circle Method to investigate Germain primes by the Major arcs. In the Section 3, we have described some equations concerning the equivalence between the Goldbach’s Conjecture and the Generalized Riemann Hypothesis. In the Section 4, we have described some equations concerning the p-adic strings and the zeta strings. In conclusion, in the Section 5, we have described some possible mathematical connections between the arguments discussed in the various sections.

(in the section “Articoli di Fisica – Matematica”)

9) “The Fibonacci’s zeta function. Mathematical connections with some sectors of String Theory”

Michele Nardelli and Rosario Turco. 1. Dipartimento di Scienze della Terra Università degli Studi di Napoli Federico II, Largo S. Marcellino, 10 80138 Napoli, Italy – 2. Dipartimento di Matematica ed Applicazioni “R. Caccioppoli” Università degli Studi di Napoli “Federico II” – Polo delle Scienze e delle Tecnologie Monte S. Angelo, Via Cintia (Fuorigrotta), 80126 Napoli, Italy

Abstract

In this paper we have described, in the **Section 1**, the Fibonacci’s zeta function and the Euler-Mascheroni constant and in the **Section 2**, we have described some sectors of the string theory: zeta strings, zeta nonlocal scalar fields and some Lagrangians with zeta Function nonlocality. In conclusion, in the **Section 3**, we have described some possible mathematical connections.

(in the section “Articoli di Fisica-Matematica”)

10) “Goldbach, Twin Primes and Polignac Equivalent RH, the Landau’s prime numbers and the Legendre’s conjecture. Mathematical connections with “Aurea” section and some sectors of String Theory”

Rosario Turco, Maria Colonnese, Michele Nardelli, Giovanni Di Maria, Francesco Di Noto, Annarita Tulumello
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Abstract

In this work the authors will explain and prove in the **Section 1** three equivalent RH, which are obtained linking $G(N)/N$ with Li and $g(N)/N$ with Li . Moreover the authors will show a new step function for $G(N)/N$ and, through the GRH, a generalization for Polignac. Furthermore, will explain and prove in the **Section 2** an equivalent RH which is linked to the Landau’s prime numbers and discuss on the Legendre’s conjecture and on the infinity of Landau’s prime numbers. In conclusion, we describe in the **Section 3** the mathematical connections with aurea ratio and in the **Section 4** with some equations concerning p-adic strings, p-adic and adelic zeta functions, zeta strings and zeta nonlocal scalar fields.

11) **On the Riemann Hypothesis. Formulas explained - $\psi(x)$ as equivalent RH. Mathematical connections with “Aurea” section and some sectors of String Theory**

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Abstract

In this work the authors will examine the themes of RH, equivalent RH and GRH already presented in [25]. The authors will explain some formulas and will show other special functions that are usually introduced with the PNT and useful to investigate other ways. In the **Sections 1** and **2**, we describe $\psi(x)$, i.e. the 2nd Chebyshev’s function as equivalent RH. In the **Section 3**, we describe a step function and a generalization of Polignac. In the **Section 4**, we describe some equations concerning p-adic strings, p-adic and adelic zeta functions, zeta strings and zeta nonlocal scalar fields. In conclusion, in the **Section 5**, we have described some possible mathematical connections between adelic strings and Lagrangians with Riemann zeta function with some equations in Number Theory above examined.

[\(in the section “Articoli su Goldbach”\)](#)

12) **“Links between string theory and the Riemann’s zeta function”**

Rosario Turco, Maria Colonnese, Michele Nardelli - Dipartimento di Scienze della Terra Università degli Studi di Napoli Federico II, Largo S. Marcellino, 10 80138 Napoli, Italy - Dipartimento di Matematica ed Applicazioni “R. Caccioppoli” Università degli Studi di Napoli “Federico II” – Polo delle Scienze e delle Tecnologie Monte S. Angelo, Via Cintia (Fuorigrotta), 80126 Napoli, Italy

Abstract

There is a connection between string theory and the Riemann’s zeta function: this is an interesting way, because the zeta is related to prime numbers and we have seen on many occasions how nature likes to express himself through perfect laws or mathematical models. In [6] the authors showed all the mathematical and theoretical aspects related to the Riemann’s zeta, while in [9] showed the links of certain formulas of number theory with the golden section and other areas such as string theory. The authors have proposed a solution of the Riemann hypothesis (RH) and

the conjecture on the multiplicity of nontrivial zeros, showing that they are simple zeros [7][8]. In [10] [11] have proposed hypotheses equivalent RH, in [12] [13] the authors have presented informative articles on the physics of extra dimensions, string theory and M-theory, in [15] the conjecture Yang and Mills, in [16] the conjecture of Birch and Swinnerton-Dyer.

(in the section “Articoli di Fisica – Matematica”, with title in Italia language

“Connessione tra la teoria delle Stringhe e la funzione Zeta di Riemann”

13) “MERSENNE’s PRIME NUMBERS”

eng. Rosario Turco, prof. Maria Colonnese

Abstract

The authors present several lemmas and theorems on Mersenne s prime numbers. Some theorems are new. Of particular interest is the proof of primality tests on the Mersenne composite and the demonstration that the New Mersenne Conjecture is true.

So the authors say:

M3 prime MM3 prime!

M5 prime MM5 NOT prime

M7 prime MM7 prime!

M13 prime MM13 NOT prime

M17 prime MM17 NOT prime

M19 prime MM19 NOT prime

M31 prime MM31 prime!

M61 prime MM61 NOT prime

M89 prime MM89 NOT prime

M107 prime MM107 prime!

M127 prime MM127 prime!

M521 prime MM521 NOT prime

M607 prime MM607 prime!

(in the section “Articoli sulla Teoria dei Numeri”)

14) “On the shoulders of giants” dedicated to Georg Friedrich Bernhard Riemann

eng. Rosario Turco, prof. Maria Colonnese, Dr. Michele Nardelli, prof. Giovanni Di Maria, Francesco Di Noto, prof. Annarita Tulumello

Abstract

This work presents various mathematical basic ideas, for the understanding of issues relating to the Riemann hypothesis (RH), the RH equivalent and the GRH. This Block Notes of Math shows also subproblems of the RH, the LH hypotheses, the factorization and the main links between all the equations involved, through a grid connections. The authors then show how the "RSA code" can be under attack, where the factorization of a semiprime N ($N=a*b$) is obtained through the Goldbach conjecture, with and a second-degree equation or through a second-degree equation of the type $x^2 = a^2 \pmod N$. Also they show how the problem of Basel has already solved in closed form for N odd with the constants zeta. Then they propose a new conjecture through the use of average cumulative Mertens function linked to the Mertens function and finally there is the presentation of a conjecture of how $G(N)$, the number of solutions of Goldbach, and $g(N)$, the number of twin primes, are linked with the logarithm integral of Gauss and the RH. This conjecture is candidate as additional and equivalent hypothesis of the RH.

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