Research Article
Volume 10:3, 2021

Journal of
Applied & Computational Mathematics

ISSN: 2168-9679 Open Access

Prime Multiple Factoriangular Numbers

Swati Bisht*

Department of Mathematics, S.V.Govt.P.G.College Lohaghat, India

Abstract

S. Bisht defined a class of sequences called multiple Factoriangular sequences of the form Ft (n,k) = (n!)k +∑nk in a recent paper, and we have a special set of multiple Factoriangular numbers corresponding to each sequence. We expand the concept in this paper to find all the multiple Factoriangular primes.

Keywords: Prime numbers • Fermat numbers • Fermat's prime • Multiple Factoriangular numbers • Multiple Factoriangular primes

Introduction

In a recent work Bisht S. and Uniyal A.S. defined multiple Factoriangular numbers as a generalization of Factoriangular numbers is known as Multiple Factoriangular numbers and are defined as, Ft (n,k) = (n!)k +∑nk Where ∑nk = TN (k) and n, k ϵ N.

We know that primes are very crucial for the universe of integers. A prime number is an integer greater than 1 which has only prime factors 1 and itself [1-4]. We know that there are various types of primes discussed so far like Mersenne prime, Fermat's prime, Fibonacci prime , twin prime etc. So here we have discussed a new family of primes called multiple Factoriangular primes defined as the multiple Factoriangular numbers which are prime. We know that the primes are infinite So can be find an equation to find nth prime .In this paper we will calculate multiple Factoriangular primes in an given interval .

Proofs and Discussions

Theorem 2.1. Multiple Factoriangular numbers for any n, k=2 i.e. Ft (n, 2) are composite.

Proof: The proof is given in The paper mentioned in ref 2.

Theorem 2.2. All The Fermat's number are multiple Factoriangular numbers.

Proof: We know multiple Factoriangular number are given by

Ft (n, k) = (n!)k +∑nk

For particular value n=2, k= 2n – 1

We have Ft (2, 2n-1) = Ft (2, 2n -1) = (2!)2n –1 + Σ 22n-1 = 22n +1.

Hence we get sequence of Fermat numbers

Corollary: All the Fermat primes are multiple Factoriangular primes.

Theorem 2.3 Only Fermat's Prime are the multiple Factoriangular prime in the interval [1,1050].

Proof: By trial and error method , we check each and every value of multiple Factoriangular number for every n,k we get the only primes sequence 3,5,17,257, 65537 corresponding to (2,0),(2,1) ,(2,3) , (2,7) and (2, 15) values of (n,k). These are the only primes till 1050.

Conclusion

Quantity of multiple Factoriangular primes are very less these are only 5 in number till 1050 these are 3 ,5,15,257,65537 for all possible values of n and k which coincides with Fermat's prime.

Future Scope

Taking the consideration of Multiple Factoriangular number we can go for the complete factorization of Fermat's number which is always became a mystery for mathematicians. Also we extend the result beyond 1050 for the theorem 2.3.

References

1. Borwein Jonathan M, Bradley David M, Crandall Richard E. "Computational strategies' for Riemann for Zeta Function." *J Comput Appl Math.* 121 (2000): 247-296.
2. Berndt Bruce C. "Ramanujans Notebooks, part 4." New York: Springer-Verlag1994
3. Derbyshire J. "Prime obsession: Bernhard Riemann Greatest Unsolved problem in mathematics." New York:Penguin (2004).
4. Edward Hopper M, Riemann Zeya. "Function New York: Dover." 2001
5. Hardy GH, Little wood JE. *Acta Math* 41 (1918): 119-196
6. Hardy GH. "The series 2.3 in Ramanujan; Twelve lecture on subject suggested by his Life and Work." 3rd ed. New York: Chelsea 1999.
7. Havil J Gamma. "Exploring Euler's constant Princeton." NJ: Princeton University (2003): 42

***Address for Correspondence:** Swati Bisht, Department of Mathematics, S.V.Govt.P.G.College Lohaghat, India, E-mail: bisht.swati22@gmail.com*

Received 17 February 2021; **Accepted** 19 March 2021; **Published** 26 March 2021

How to cite this article: Swati Bisht. Prime Multiple Factoriangular Numbers. *J Appl Computat Math* 9 (2020): 468.