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AN INTERESTING OBSERVATION ON RAMANUJAN NUMBER 1729

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Abstract: In this paper by taking Ramanujan number 1729 as an illustration an important method of obtaining some prime numbers has been studied satisfying some specific conditions or properties.

Keywords and Phrases: Concatenation, reverse concatenation, key, prime key, Disjoint Prime Concatenation (DPC).

1. Introduction

For a given prime number p, one can get another prime number through a given natural number.

Theorem 1. *Let P be any prime number. Let a be any integer. Then there exists natural number n such that $P + n.a$ is a prime number.*

Example 1. For the given prime number 13 and for the positive integer 5, $13 + 2 \times 5 = 23$ is a prime number. Also, $13 + 6 \times 5 = 43$, a prime.

In mathematics **concatenation** of two positive integers is the joining of two numbers by their numerals. That is, the concatenation of 231 and 795 is 231795.

Theorem 2. *For a given composite number t, and for a given number n which is relatively prime to t, there exists a natural number r such that $t + n \times r$ is prime.*

For example; with a given composite number 24 and 7, $24 + 7 \times 5 = 59$, a prime number.

The concatenation of the first n Fibonacci numbers gives $1, 11, 112, 1123, 11235, ...$ There are no primes in the first 1580 terms other than $n = 2$ and 4, corresponding to primes 11 and 1123. 1729 is known as Ramanujan number and this is not a prime number as $1729 = 7 \times 13 \times 19$.