On the sum of three consecutive values of the MC function

Abstract. In a previous paper I defined the MC(x) function in the following way: Let MC(x) be the function defined on the set of odd positive integers with values in the set of primes such that: MC(x) = 1 for x = 1; MC(x) = x, for x prime; for x composite, MC(x) has the value of the prime which results from the following iterative operation: let x = p(1)*p(2)*...*p(n), where p(1),..., p(n) are its prime factors; let y = p(1) + p(2) +...+ p(n) – (n – 1); if y is a prime, then MC(x) = y; if not, then y = q(1)*q(2)*...*q(m), where q(1),..., q(m) are its prime factors; let z = q(1) + q(2) +...+ q(m) – (m – 1); if z is a prime, then MC(x) = z; if not, it is iterated the operation until a prime is obtained and this is the value of MC(x). In this paper I present a property of this function.

The sequence of the first 100 values of MC(x), for 1 ≤ x ≤ 199:

1, 3, 5, 7, 5, 11, 13, 7, 17, 19, 5, 23, 5, 7, 29, 31, 13, 11, 37, 7, 41, 43, 5, 47, 13, 19, 53, 7, 5, 59, 61, 11, 17, 67, 5, 71, 73, 11, 17, 79, 5, 83, 5, 31, 89, 19, 13, 23, 97, 7, 101, 103, 13, 107, 109, 7, 113, 7, 7, 23, 5, 43, 13, 127, 5, 131, 5, 11, 137, 139, 13, 23, 13, 7, 149, 151, 5, 11, 157, 7, 29, 163, 17, 167, 5, 23, 173, 7, 61, 179, 181, 11, 41, 7, 13, 191, 193, 19, 197, 199.

As I mentioned in abstract, in my previous paper "An interesting property of the primes congruent to 1 mod 45 and an ideea for a function" I defined the MC function, without having already found applications for it in diophantine analysis but sensing that for sure such applications do exist.

Calculating the value of MC function for several sets of relatively large, consecutive, odd numbers, I found out that the value of MC function is obtained in fewer steps (in other words, a prime is obtained easier through the iterative operation that defines the function) for the numbers which are equal to the sum of the values of MC function for three consecutive numbers (odd, of course, the function is defined only on odd numbers). To exemplify, MC(x), where x = MC(193) + MC(195) + MC(197) is found immediately (in one step), because MC(x) = x = 409, a prime number. In other words, MC(MC(n) + MC(n + 1) + MC(n + 2)) appear to be obtained easier than the average MC(m), where m are the numbers comparable as lenght (number of digits) to MC(n) + MC(n + 1) + MC(n + 2).

Examples:

Let's consider the consecutive odd numbers 181811, 181813, 181815, 181817, 181819 with the following corresponding values for MC: 23, 181813, 11, 1721, 7.

Let's calculate MC(23 + 181813 + 11) = MC(181847)
: 181847 = 43*4229;
: 43 + 4229 – 1 = 4271, prime, so is the value of MC(x), obtained in two steps.
Let's calculate MC(181813 + 11 + 1721) = MC(183545)
: 183545 = 5*36709;
: 5 + 36709 – 1 = 36713, prime, so is the value of MC(x), obtained in two steps.
Let's calculate MC(11 + 1721 + 7) = MC(1739)
: 1739 = 37*47;
: 37 + 47 – 1 = 83, prime, so is the value of MC(x), obtained in two steps.

Let's consider the consecutive odd numbers 982451651, 982451653, 982451655, 982451657, 982451657 with the following corresponding values for MC: 59, 982451653, 14251, 7873, 787.

Let’s calculate MC(59 + 982451653 + 14251) = MC(982465963)
: 982465963 is prime, so is the value of MC(x), obtained in one step.

Let’s calculate MC(982451653 + 14251 + 7873) = MC(982473777)
: 982473777 = 3*3*109163753;
: 3 + 3 + 109163753 – 2 = 109163757 = 3*1223*29753;
: 3 + 1223 + 29753 – 2 = 30977, prime, so is the value of MC(x), obtained in three steps.

Let’s calculate MC(14251 + 7873 + 787) = MC(22911)
: 22911 = 3*7*1091;
: 3 + 7 + 1091 – 2 = 1099 = 7*157;
: 7 + 157 – 1 = 163, prime, so is the value of MC(x), obtained in three steps.