The MC function and other three Smarandache type sequences, diophantine analysis

Abstract. In seven of my previous papers, I defined the MC function and I showed some of its possible applications. In this paper I present new interesting properties of other three Smarandache type sequences analyzed through the MC function.

1. The reverse sequence

Definition:

S_n is defined as the sequence obtained through the concatenation of the first n positive integers, in reverse order.

The first ten terms of the sequence (A000422 in OEIS):

1, 21, 321, 4321, 54321, 654321, 7654321, 87654321, 987654321, 10987654321.

Notes:

The primes appear very rare among the terms of this sequence: until now there are only two known, corresponding to n = 82 (a number having 155 digits) şi n = 37765 (a number having 177719 digits).

Analysis through MC function:

Another interesting property of the terms of the reverse sequence could be the following one: seems that the value of MC function for many of these terms is equal to a small prime; for 10 from the first 13 terms the value of MC function is equal to 3 (for 21 and 4321), to 13 (for 321, 54321 and 7654321), to 17 (for 987654321, 1110987654321 and 13121110987654321) and to 37 (for 87654321 and 1413121110987654321).

2. The "n concatenated n times" sequence

Definition:

S_n is defined as the sequence of the numbers obtained concatenating n times the number n.

The first ten terms of the sequence (A000461 in OEIS):

1, 22, 333, 4444, 55555, 666666, 7777777, 88888888, 999999999, 10101010101010101010.

Notes:

The terms of this sequence can't obviously be primes, all terms of this sequence being repdigit numbers, therefore multiples of repunit numbers.

Analysis through MC function:

Another interesting property of the terms of the "n concatenated n times" sequence could be the following one: seems that the value of MC function for many of the odd terms (the MC function is defined only on odd numbers) is equal to a small prime (41 for 333, 7 for 55555, 241 for 7777777, 19 for 999999999, 107 for 11111111111111111111, 97 for 13131313131313131313131313 and 13 for 17171717171717171717171717171717).

3. The back concatenated odd sequence

Definition:

The sequence obtained concatenating the odd numbers in reverse order.

The first seven terms of the sequence (A038395 in OEIS):

1, 31, 531, 7531, 97531, 1197531, 131197531, 15131197531, 1715131197531, 191715131197531.

Analysis through MC function:

Another interesting property of the terms of the back concatenated odd sequence could be the following one: seems that the value of MC function for many of these terms is equal to a small prime; for the first 11 terms the value of MC function is equal to 1 (for 1), to 7 (for 21191715131197531), to 11 (for 531 and 1197531), to 17 (for 97531), to 19 (for 131197531, 1715131197531 and 191715131197531) and to 23 (for 7531 and 15131197531).