The notions of c-reached prime and m-reached prime

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Abstract. In spite the fact that I wrote seven papers on the notions (defined by myself) of c-primes, m-primes, c-composites and m-composites (see in my paper "Conjecture that states that any Carmichael number is a cm-composite" the definitions of all these notions), I haven't thinking until now to find a connection, beside the one that defines, of course, such an odd composite n, namely that, after few iterative operations on n, is reached a prime p, between the number n and the prime p. This is what I try to do in this paper, and also to give a name to this prime p, namely, say, "reached prime", and, in order to distinguish, because a number can be same time c-prime and m-prime, respectively c-composite and m-composite, "c-reached prime" or "m-reached prime".

Notes:

We name "the c-reached prime" the prime number that is reached, after the iterative operations that defines a c-prime. We also name "the m-reached prime" the prime number that is reached, after the iterative operations that defines a m-prime.

We name "a c-reached prime" a prime number that is reached, after the iterative operations that defines a c-composite. We also name "a m-reached prime" a prime number that is reached, after the iterative operations that defines a m-prime.

Note that I used "a" beside "the" because a c-composite (m-composite) can have more than one c-reached prime (m-reached prime).

This names do not indicate an intrinsic quality of the respective primes, because any prime can be "reached", they have sence just in association with the respective c-prime, c-composite, m-prime or m-composite and it is just useful to simplify the reference to it, not to adress to this number with the syntagma "that prime hwo is reached after the operations...".

Examples:

: The number 37 is the c-reached prime for the c-prime 4237 = 19*223 because 223 – 19 + 1 = 205 = 5*41 and 41 – 5 + 1 = 37;

: The number 241 is the m-reached prime for the m-prime 4237 = 19*223 because 223 + 19 – 1 = 241, prime.

(in the example above, the number 4237 is a cm-prime, i.e. both c-prime and m-prime, but, of course, this is not a rule)

: The number 73 is a c-reached prime for the c-composite 1729 = 7*13*19 because 7*13 – 19 + 1 = 73 and the number 241 is another c-reached prime for 1729 because 13*19 – 7 + 1 = 241;

: The number 109 is a m-reached prime for the m-composite 1729 = 7*13*19 because 7*13 + 19 - 1 = 109.

(in the example above, the number 1729 is a cm-composite, i.e. both c-composite and m-composite, but, of course, this is not a rule)

Comment:

As I mentioned in Abstract, I haven't thinking until now to find other connections between a c-prime n (m-prime) and the c-reached prime p (m-reached prime) respectively between a c-composite n (m-composite) and a c-reached prime p (m-reached prime). I'm sure that such connections exist, one of them being that n - p + 1 is often a c-prime (c-composite) respectively that n + p - 1 is often a m-prime (m-composite). I shall randomly choose some such numbers from my previous papers to prove this fact.

: 71 is the c-reached prime for 1691 = 19*89, because 89 – 19 + 1 = 71; and, indeed, 1691 – 71 + 1 = 1621 prime, so n – p + 1 = 1621 is c-prime;

: 277 is the c-reached prime for 4981 = 17*293, because 293 – 17 + 1 = 277; and, indeed, 4981 – 277 + 1 = 4705 = 5*941 and 941 – 5 + 1 = 937 prime, so n – p + 1 = 4705 is c-prime;

: 47 is the reached c-prime for 4979 = 13*383, because 383 – 13 + 1 = 371 = 7*53 and 53 – 7 + 1 = 47; and, indeed, 4979 – 47 + 1 = 4933 prime, so n – p + 1 = 4933 is c-prime;

: 13 is the reached c-prime for 589 = 19*31 because 31 – 19 + 1 = 13; and, indeed, 589 – 13 = 577, prime, so n – p + 1 = 577 is c-prime.

: 61 is the c-reached prime for 2581 and 2521 = 2581 – 61 + 1 is a prime (implicitly, by definition c-prime);

: 167 is the c-reached prime for 1213 and 1045 = 1211 – 167 + 1 is a c-composite because 1045 = 5*11*19 and 5*11 – 19 + 1 = 37 prime;

: 239 is the c-reached prime for 1811 and 1811 + 239 - 1 = 2049 = 3*683 is a m-prime because 683 + 3 – 1 = 685 = 5*137 and 137 + 5 – 1 = 141 = 3*47 and 47 + 3 – 1 = 49 and 7 + 7 – 1 = 13, prime;

: 179 is the m-reached prime for 2171 and 2171 + 179 – 1 = 2349 is a m-composite because 2349 = 3^4*29 and 3^4 + 29 – 1 = 109, prime;

: 541 is the m-reached prime for 41041 and 41041 + 541 – 1 = 41581 is a m-composite because 41581 = 43*967 and 967 + 43 – 1 = 1009, prime;

: 541 is the m-reached prime for 29341 and 29341 + 541 – 1 = 29881 is a prime.

Conclusion:

Indeed, I am already convinced by this connection between the numbers described above, so I stop here with the examples and I shall try in future papers to highlight other such conections.