Primes obtained concatenating even numbers n with 0 then with n+2 then again with 0 then with n+5

Abstract. In this paper I make the following three conjectures: (I) there exist an infinity of primes p obtained concatenating even numbers n with 0 then with n + 2, then again with 0, then with n + 5 (example: for n = 44, the number p = 44046049 is prime). It is notable that are found chains with 4 primes p obtained for 4 consecutive even numbers n (example: 17201740177, 17401760177, 17601780181, 17801800183, obtained for 172, 174, 176, 178); (II) there exist an infinity of pairs of primes (p, q) obtained aplying on two consecutive even numbers (m, n) the method of concatenation showed in the conjecture above (note that q – p = 20202; 2002002; 200020002 and so on); (III) there exist, for any k positive integer, an infinity of primes q = p + n, where p is prime and n is the number obtained concatenating 2 with a number of k digits of 0 then with 2 then again with the same number of k digits of 0 then again with 2.

Conjecture 1:

There exist an infinity of primes p obtained concatenating even numbers n with 0 then with n + 2, then again with 0, then with n + 5 (example: for n = 44, the number p = 44046049 is prime).

The sequence of primes p:

: for n = 2, p = 20407 is prime;
: for n = 4, p = 40609 is prime;
: for n = 6, p = 608011 is prime;
: for n = 12, p = 12014017 is prime;
: for n = 16, p = 16018021 is prime;
: for n = 24, p = 24026029 is prime;
: for n = 26, p = 26028031 is prime;
: for n = 28, p = 28030033 is prime;

[note the chain of three primes p (24026029, 26028031, 28030033) obtained for three consecutive even numbers n (24, 26, 28)]

: for n = 42, p = 42044047 is prime;
: for n = 44, p = 44046049 is prime;
: for n = 58, p = 58060063 is prime;
: for n = 66, p = 66068071 is prime;
: for n = 78, p = 78080083 is prime;
: for n = 108, p = 10801100113 is prime;

: for n = 112, p = 11201140117 is prime;
: for n = 114, p = 11401160119 is prime;
: for n = 172, p = 17201740177 is prime;
: for n = 174, p = 17401760179 is prime;
: for n = 176, p = 17601780181 is prime;
: for n = 178, p = 17801800183 is prime;

[note the chain of four primes p (17201740177, 17401760177, 17601780181, 17801800183) obtained for four consecutive even numbers n (172, 174, 176, 178)]

: for n = 186, p = 18601880191 is prime;
: for n = 204, p = 20402060209 is prime;
: for n = 218, p = 21802200223 is prime;
: for n = 232, p = 23202340237 is prime;
: for n = 234, p = 23402360239 is prime;
: for n = 242, p = 24202440247 is prime;
: for n = 252, p = 25202540257 is prime;
: for n = 276, p = 27602780281 is prime;
: for n = 282, p = 28202840287 is prime;
: for n = 284, p = 28402860289 is prime;
: for n = 292, p = 29202940297 is prime;
: for n = 306, p = 30603080311 is prime;
: for n = 328, p = 32803300333 is prime;
: for n = 352, p = 35203540357 is prime;
: for n = 372, p = 37203740377 is prime;
: for n = 376, p = 37603780381 is prime;
: for n = 382, p = 38203840387 is prime;
(...)
: for n = 1008, p = 10080101001013 is prime;
: for n = 1018, p = 10180102001023 is prime;
: for n = 1026, p = 10260102801031 is prime;
: for n = 1046, p = 10460104801051 is prime;
(...)
: for n = 10000002, p = 100000020100000040100000007;
(...)
: for n = 100000000000002,
p = 1000000000000020100000000000004010000000000007.
(...)
: for n = 1000000000000000000002,
p=10000000000000000000002010000000000000000000000401000000000000000000007.

Conjecture 2:

There exist an infinity of pairs of primes (p, q) obtained aplying on two consecutive even numbers (m, n) the method of concatenation showed in the conjecture above (note that q – p = 20202; 2002002; 200020002 and so on).

The sequence of pairs of primes (p, q):

: (p, q) = (20407, 40609) for (m, n) = (2, 4);
: (p, q) = (40609, 608011) for (m, n) = (4, 6);
: (p, q) = (24026029, 26028031) for (m, n) = (24, 26);
: (p, q) = (26028031, 28030033) for (m, n) = (26, 28);
: (p, q) = (42044047, 44046049) for (m, n) = (42, 44);
: (p, q) = (11201140117, 11401160119) for (112, 114);
: (p, q) = (17201740177, 17401760179) for (172, 174);
: (p, q) = (17201740177, 17601780181) for (174, 176);
: (p, q) = (17601780181, 17801800183) for (176, 178);
: (p, q) = (23202340237, 23402360239) for (232, 234);
: (p, q) = (28202840287, 28402860289) for (282, 284);
(...)

Conjecture 3:

There exist, for any k positive integer, an infinity of primes q = p + n, where p is prime and n is the number obtained concatenating 2 with a number of k digits of 0 then with 2 then again with the same number of k digits of 0 then again with 2.

The sequence of pairs of primes (p, p + 20202):
: (17, 20219), (29, 20231), (31, 20233), (47, 20249), (59, 20261), (67, 20269) (...)

The sequence of pairs of primes (p, p + 2002002):
: (7, 2002009), (17, 2002019), (59, 2002061) (...)

The sequence of pairs of primes (p, p + 200020002):
: (29, 200020031), (31, 200020033), (41, 200020043), (67, 200020069) (...)

The sequence of pairs of primes (p, p + 20000200002):
: (41, 2000020004309) (...)

The sequence of pairs of primes (p, p + 2000002000002):
: (61, 2000002000063) (...)

The sequence of pairs of primes (p, p + 200000020000002):
: (59, 200000020000061) (...)

The sequence of pairs of primes (p, p + 20000000200000002):
: (19, 20000000200000021) (...)

The sequence of pairs of primes (p, p + 2000000002000000002):
: (67, 2000000002000000069) (...)