

Primes obtained concatenating n consecutive numbers and then the resulting number with 1

Abstract. In this paper I state the following conjecture: For any positive integer n , $n > 1$, there exist a sequence having an infinity of prime terms obtained concatenating n consecutive numbers and then the resulting number, to the right, with 1. Examples: for $n = 2$, the sequence obtained this way contains the primes 10111, 15161, 18191, 21221 (...); for $n = 9$, the sequence obtained this way contains the primes 1234567891, 910111213141516171, 2021222324252627281, 2930313233343536371 (...).

Conjecture:

For any positive integer n , $n > 1$, there exist a sequence having an infinity of prime terms p obtained concatenating n consecutive numbers and then the resulting number, to the right, with 1. Examples: for $n = 2$, the sequence obtained this way contains the primes 10111, 15161, 18191, 21221 (...); for $n = 9$, the sequence obtained this way contains the primes 1234567891, 910111213141516171, 2021222324252627281, 2930313233343536371 (...).

The sequence of primes p for $n = 2$:

: 10111, 15161, 18191, 21221, 24251, 25261, 27281,
31321, 34351, 43441, 46471, 48491, 51521, 60611,
76771, 78791, 79801, 87881, 90911, 91921, 93941
(...)

The sequence of primes p for $n = 3$:

: 1231, 2341, 4561, 6781, 89101, 1112131, 1213141,
1718191, 1920211, 2122231, 2425261, 2829301,
3132331, 3334351, 3435361, 3536371, 3839401, 3940411
(...)

The sequence of primes p for $n = 4$:

: 67891, 789101, 222324251, 363738391, 434445461,
464748491, 495051521, 555657581, 585960611,
646566671, 697071721, 707172731, 798081821 (...)

The sequence of primes p for $n = 5$:

: 9101112131, 15161718191, 21222324251, 36373839401,
43444546471, 46474849501 (...)

The sequence of primes p for n = 6:

: 3456781, 4567891, 56789101 (...)

The sequence of primes p for n = 7:

: 91011121314151, 181920212223241, 313233343536371
(...)

The sequence of primes p for n = 8:

: 45678910111, 15161718192021221, 37383940414243441
(...)

The sequence of primes p for n = 9:

: 1234567891, 910111213141516171, 2021222324252627281,
2930313233343536371, 3839404142434445461 (...)

The least prime p for the following values of n:

: p = 303132333435363738391, for n = 10;
: p = 12345678910111, for n = 11;
: p = 939495969798991001011021031041, for n = 12;
: p = 91011121314151617181920211, for n = 13;
: p = 39404142434445464748495051521, for n = 14;
: p = 3334353637383940414243444546471, for n = 15;
: p = 123456789101112131415161, for n = 16;
: p = 25262728293031323334353637383940411,
for n = 17;
: p = 2223242526272829303132333435363738391,
for n = 18;
: p = 161718192021222324252627282930313233341,
for n = 19.

Observation:

An interesting question is also the following one: if m is a non-null positive integer, are there an infinity of primes q obtained concatenating m with consecutive numbers and then, the resulting number, with 1? Example: is, for m = 1, the sequence of primes 1231, 1234567891, 12345678910111 (...) infinite? Or, for m = 2, the sequence 2341, 23456789101112131415161718192021222324251 (...) ? Or, for any non-null positive integer m?

The sequence of the least primes q for m starting from 1:

: 1231, 2341, 3456781, 4561, 6781, 789101, 89101,
9101112131, 10111, 1112131, 1213141 (....)