

Conjecture on the primes $S(n+1)+S(n)-1$ where $S(n)$ is a term in the concatenated odd sequence

Abstract. In this paper I make the following conjecture: There exist an infinity of primes $S(n+1) + S(n) - 1$, where $S(n)$ is a term in Smarandache concatenated odd sequence (which is defined as the sequence obtained through the concatenation of the first n odd primes).

Conjecture :

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The concatenated odd sequence:

(A089933 in OEIS)

: 3, 35, 357, 35711, 3571113, 357111317, 35711131719, 3571113171923, 357111317192329, 35711131719232931, 3571113171923293137, 357111317192329313741, 35711131719232931374143, 3571113171923293137414347 (...)

Note: Florentin Smarandache conjectured that there exist an infinity of prime terms of this sequence. The terms of this sequence are primes for the following values of n : 2, 10, 16, 34, 49, 2570 (the term corresponding to $n = 2570$ is a number with 9725 digits); there is no other prime term known though where checked the first about 26 thousand terms of this sequence.

The primes of the form $P = S(n+1) + S(n) - 1$:

: $P_1 = 37 = S(2) + S(1) - 1 = 35 + 35 - 1$;
 : $P_2 = 36067 = S(4) + S(3) - 1 = 35711 + 357 - 1$;
 : $P_3 = 360682429 = S(6) + S(5) - 1 = 357111317 + 3571113 - 1$;
 : $P_4 = 360682430364251 = S(9) + S(8) - 1 = 357111317192329 + 3571113171923 - 1$;
 : $P_5 = 36068243036425260687883 = S(14) + S(13) - 1 = 35711131719232931374143 + 357111317192329313741 - 1$;

: P6 = 360682430364252606878849099 = S(16) + S(15) - 1
 = 357111317192329313741434753 +
 3571113171923293137414347 - 1;
 : P7 = 3606824303642526068788491011321293943
 = S(21) + S(20) - 1 =
 3571113171923293137414347535961677173 +
 35711131719232931374143475359616771 - 1;
 (...)

Note that there also exist primes of the form $Q = S(n+1) - S(n) + 1$; I conjecture that there exist an infinity of such primes too:

: Q1 = 3535403 = S(4) - S(3) + 1 = 3571113 - 35711 + 1;
 : Q2 = 35354020402040603 = S(10) - S(9) + 1 =
 35711131719232931 - 357111317192329 + 1;
 : Q3 = 3535402040204060207 = S(11) - S(10) + 1 =
 3571113171923293137 - 35711131719232931 + 1;
 (...)