Four sequences of numbers obtained through concatenation, rich in primes and semiprimes

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Abstract. In this paper I will define four sequences of numbers obtained through concatenation, definitions which also use the notion of "sum of the digits of a number", sequences that have the property to produce many primes, semiprimes and products of very few prime factors.

Observation 1:

Let x be a number with the sum of the digits equal to p, where p is prime, and y the number obtained through concatenation of x and p; then y is often a prime, a semiprime or a product of very few prime factors.

Numbers that belong to this sequence are:

: 2911 (semiprime), 9211 (semiprime), 4913 (cube of prime), 9413 (prime), 8917 (semiprime), 9817 (prime), 99119 (prime), 91919 (semiprime), 19919 (prime), 99523 (prime), 95923 (prime), 59923 (semiprime), 999431 (prime), 949931 (prime), 499931 (semiprime) etc.

Observation 2:

Let x be a number equal to the sum of the digits of p, where p is prime, and y the number obtained through concatenation of x and p; then y is often a prime, a semiprime or a product of very few prime factors.

Numbers that belong to this sequence are:

: 211 (prime), 413 (semiprime), 817 (semiprime), 1019 (prime), 523 (prime), 1129 (prime), 431 (prime), 1037 (semiprime), 541 (prime), 743 (prime), 1147 (semiprime), 853 (prime), 1459 (prime), 761 (prime), 1367 (prime), 871 (semiprime), 1073 (semiprime) etc.

Observation 3:

Let x be a number whose sum of the digits is equal to the sum of the digits of p, where p is prime, and y the number obtained through concatenation of x and p; then y is often a prime, a semiprime or a product of very few prime factors.

Numbers that belong to this sequence are:

: 1111 (semiprime), 10111 (prime), 2011 (prime), 20011 (prime), 200011 (semiprime), 2213 (prime), 22013 (prime), 3113 (semiprime), 4013 (prime), 40013 (prime), 400013 (semiprime), 4000013 (semiprime) etc.

Observation 4:

Let x be a number with the sum of the digits equal to p, where p is prime, let y = 6*x + 5 and z the number obtained through concatenation of y and p; then z is often a prime, a semiprime or a product of very few prime factors.

Numbers that belong to this sequence are:

: For [p, x, y] = [11, 29, 179] we have z = 17911 prime;
: For [p, x, y] = [11, 92, 557] we have z = 55711 prime;
: For [p, x, y] = [11, 902, 5417] we have z = 541711 prime;
: For [p, x, y] = [29, 9299, 55799] we have z semiprime;
: For [p, x, y] = [29, 9929, 59579] we have z semiprime;
: For [p, x, y] = [29, 9992, 59957] we have z = 5995729 prime;
: For [p, x, y] = [29, 2999, 17999] we have z = 1799929 prime;
: For [p, x, y] = [29, 9299, 55799] we have z semiprime;
: For [p, x, y] = [29, 9929, 59579] we have z semiprime;
: For [p, x, y] = [29, 9992, 59957] we have z = 5995729 prime.

Note:

In order to see wherefrom the idea of this sequence originate see my previous paper “A conjecture about a large subset of Carmichael numbers related to concatenation”.