Conjecture on the pairs of twin primes involving concatenation

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Abstract. In this paper I make the following conjecture: For any pair of twin primes [p, p + 2], p > 5, there exist a prime q, 5 < q < p, such that the number n obtained concatenating (from the left to the right) q with p + 2, then with p, then again with q is prime. Example: for [p, p + 2] = [18408287, 18408289] there exist q = 37 such that n = 37184082891840828737 is prime. Note that the least values of q that satisfies this conjecture for twenty consecutive pairs of twins with 8 digits are 19, 7, 19, 11, 23, 23, 47, 7, 47, 17, 13, 17, 17, 37, 83, 19, 13, 13, 59 and 97 (all twenty primes lower than 100!), the corresponding primes n obtained having 20 digits! This method appears to be a good way to obtain big primes with a high degree of ease and certainty.

Conjecture:

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The least such primes q for the first few pairs of twins:

: q = 7 for [p, p + 2] = [11, 13], because n = 713117 is prime;

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: q = 11 for [p, p + 2] = [29, 31], because n = 11312911 is prime (note that 13312913 and 17312917 are also primes);

: q = 19 for [p, p + 2] = [41, 43], because n = 19434119 is prime;

: q = 7 for [p, p + 2] = [59, 61], because n = 761597 is prime (note that 11615911, 37615937 and 53615953 are also primes);

: q = 23 for [p, p + 2] = [71, 73], because n = 23737123 is prime (note that 29737129, 31737131, 43737143, 47737147 and 67737167 are also primes);

: q = 7 for [p, p + 2] = [101, 103], because n = 71031017 is prime (note that 1710310117, 1910310119, 4710310147 and 5310310153 are also primes);

: q = 43 for [p, p + 2] = [107, 109], because n = 4310910743 is prime (note that 4710910747, 5310910753 and 7110910771 are also primes);

: q = 7 for [p, p + 2] = [137, 139], because n = 71391377 is prime (note that 1113913711, 4313913743 and 6113913761 are also primes);

: q = 17 for [p, p + 2] = [149, 151], because n = 1715114917 is prime (note that 2915114929, 5315114953, 103151149103, 113151149113 and 131151149131 are also primes);

: q = 7 for [p, p + 2] = [179, 181], because n = 71811797 is prime (note that 2918117929, 4718117947, 131181179131 and 149181179149 are also primes);

: q = 37 for [p, p + 2] = [191, 193], because n = 3719319137 is prime (note that 4319319143, 7319319173, 103193191103, 137193191137 and 167193191167 are also primes).

The least such primes q for 16 larger consecutive pairs of twins:

: q = 19 for [p, p + 2] = [18405479, 18405481], because n = 19184054811840547919 is prime;
: q = 7 for [p, p + 2] = [18405719, 18405721], because n = 718405721184057197 is prime;
: q = 19 for [p, p + 2] = [18405731, 18405733], because n = 19184057331840573119 is prime;
: q = 11 for [p, p + 2] = [18405899, 18405901], because n = 11184059011840589911 is prime;
: q = 23 for [p, p + 2] = [18406181, 18406183], because n = 23184061831840618123 is prime;
: q = 23 for [p, p + 2] = [18406319, 18406321], because n = 23184063211840631923 is prime;
: q = 47 for [p, p + 2] = [18406667, 18406669], because n = 47184066691840666747 is prime;

: q = 7 for [p, p + 2] = [18406769, 18406771], because n = 718406771184067697 is prime;
: q = 47 for [p, p + 2] = [18406781, 18406783], because n = 47184067831840678147 is prime;
: q = 17 for [p, p + 2] = [18406979, 18406981], because n = 17184069811840697917 is prime;
: q = 13 for [p, p + 2] = [18407687, 18407689], because n = 13184076891840768713 is prime;
: q = 17 for [p, p + 2] = [18407771, 18407773], because n = 17184077731840777117 is prime;
: q = 17 for [p, p + 2] = [18408107, 18408109], because n = 17184081091840810717 is prime;
: q = 37 for [p, p + 2] = [18408287, 18408289], because n = 37184082891840828737 is prime;
: q = 83 for [p, p + 2] = [18408371, 18408373], because n = 83184083731840837183 is prime;
: q = 19 for [p, p + 2] = [18408421, 18408419], because n = 19184084211840841919 is prime;
: q = 13 for [p, p + 2] = [18408581, 18408583], because n = 13184085831840858113 is prime;
: q = 13 for [p, p + 2] = [18408749, 18408751], because n = 13184087511840874913 is prime;
: q = 59 for [p, p + 2] = [18408989, 18408991], because n = 59184089911840898959 is prime;
: q = 97 for [p, p + 2] = [18409199, 18409201], because n = 97184092011840919997 is prime.

Note that the least values of q that satisfies the conjecture above for twenty consecutive pairs of twins with 8 digits are 19, 7, 19, 11, 23, 23, 47, 7, 47, 17, 13, 17, 17, 37, 83, 19, 13, 13, 59 and 97 (all twenty primes lower than 100!), the corresponding primes n obtained having 20 digits! This method appears to be a good way to obtain big primes with a high degree of ease and certainty.