A method of finding subsequences of Poulet numbers

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Abstract. I was studying the Fermat pseudoprimes in function of the remainder of the division by different numbers, when I noticed that the study of the remainders of the division by 28 seems to be very interesting. Starting from this, I discovered a method to easily find subsequences of Poulet numbers. I understand through "finding subsequences of Poulet numbers" finding such numbers that share a non-trivial property, *i.e.* not a sequence defined like: "Poulet numbers divisible by 7".

Introduction

The way of finding such subsequences is simply to calculate the remainder of the division of a Poulet number P by the number 4*q, where q is a prime which does not divide P; surprisingly, few values of these remainders seems to occur more often than others.

Few subsequences of Poulet numbers

For q = 7, we found out that, from the first 40 Poulet numbers not divisible by 7, 14 numbers can be written as P = 28*n + 1, where n is obviously a natural number; these numbers are:

: 561, 645, 1905, 2465, 3277, 4033, 4369, 5461, 10585, 18705, 25761, 31417, 33153, 34945.

For q = 11, we found out that, from the first 40 Poulet numbers not divisible by 11, 6 numbers can be written as P = 44*n + 1; these numbers are:

: 2465, 6601, 15709, 15841, 30889, 31417.

Also for q = 11 and the first 40 Poulet numbers not divisible by 11, we found out that 6 numbers can be written as P = 44*n + 5; these numbers are:

: 1105, 2821, 4681, 5461, 8321, 18705.

For q = 13, we found out that, from the first 40 Poulet numbers not divisible by 13, 9 numbers can be written as P = 52*n + 1; these numbers are:

: 3277, 4369, 4681, 5461, 7957, 8321, 18721, 30889, 34945.

Also for q = 13 and the first 40 Poulet numbers not divisible by 13, we found out that 5 numbers can be written as P = 52*n + 29; these numbers are:

: 341, 4033, 10585, 23377, 33153.

For q = 17, we found out that, from the first 50 Poulet numbers not divisible by 17, 8 numbers can be written as P = 68*n + 1; these numbers are:

: 341, 1905, 7957, 15709, 31417, 31621, 49981, 52633.

Also for q = 17 and the first 50 Poulet numbers not divisible by 17, we found out that 4 numbers can be written as P = 68*n + 45; these numbers are:

: 10585, 16705, 49141, 60701.

For q = 19, we found out that, from the first 50 Poulet numbers not divisible by 19, 4 numbers can be written as P = 76*n + 5; these numbers are:

: 1905, 4033, 29341, 31621.

Also for q = 19 and the first 50 Poulet numbers not divisible by 19, we found out that 4 numbers can be written as P = 76*n + 37; these numbers are:

: 341, 645, 4369, 8321.

Also for q = 19 and the first 50 Poulet numbers not divisible by 19, we found out that 4 numbers can be written as P = 76*n + 45; these numbers are:

: 4681, 8481, 23377, 49141.

For q = 23, we found out that, from the first 40 Poulet numbers not divisible by 23, 4 numbers can be written as P = 92*n + 1; these numbers are:

: 645, 1105, 23001, 25761.

Also for q = 23 and the first 40 Poulet numbers not divisible by 23, we found out that 4 numbers can be written as P = 92*n + 45; these numbers are:

: 4369, 7957, 18721, 31417.

Note: Yet is interesting to study the quotients n obtained through the method above, *i.e.* the numbers n = (P – r)/4*q, where r is the remainder, *e.g.* the numbers n = (561 - 1)/4*7 = 2^2*5, n = (33153 - 1)/4*7 = 2^5*37, n = (2465 - 1)/4*11 = 2^3*7, n = (2821 - 5)/4*11 = 2^6 and so on.