

# The largest known Cunningham chain of length 3 of the first kind

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Cunningham chains of length  $n$  of the first kind are  $n$  long sequences of prime numbers  $p_1, p_2, \dots, p_n$  so that  $p_{i+1} = 2p_i + 1$  (for  $1 \leq i < n$ ). In [1] we have devised a plan to find large Cunningham chains of the first kind of length 3 where the primes are of the form  $p_{i+1} = (h_0 + cx)2^{e+i} - 1$  for some integer  $x$  with  $h_0 = 5\,775$ ,  $c = 30\,030$  and  $e = 34\,944$ .

The project was executed on the super computer of NIF in Pécs, Hungary. In this paper we report on the obtained results and discuss the implementation details. The search consisted of two stages: sieving and the Fermat test. The sieving stage was implemented in a concurrent manner using lockfree queues, while the Fermat test was trivially parallel.

## References

- [1] G. FARKAS, E. VATAI, *Sieving for large Cunningham chains of length 3 of the first kind*, *Annales Universitatis Scientiarum Budapestinensis de Rolando Eötvös nominatae Sectio Computatorica*, **40** (2013), 215–222.