
Zbl 080.26304

Erdős, Paul; Jabotinsky, Eri

On sequences of integers generated by a sieving process. I, II. (In English)

Nederl. Akad. Wet., Proc., Ser. A 61, 115-123, 124-128 (1958).

These papers deals with a family of algorithms somewhat similar to the Sieve of Erathostenes. The algorithms depend on an initial integer λ and on a sequence B of integers b_k $(k = 1, 2, ...)$ with $b_k \geq 2$. A family of intermediary sequences $A^{(i)}$ $(i = 1, 2, ...)$ consisting of integers $a_k^{(i)} (k = 1, 2, ...)$ is formed in the following way: $A^{(1)}$ is defined by $a_k^{(1)} = \lambda + k$. $A^{(i+1)}$ is obtained from $A^{(i)}$ by striking out all the terms of the form $a_{1+mb_i}^{(i)}$ $(m = 0, 1, ...)$ and by renaming terms. Finally, the sequence A consisting of integers a_k $(k = 1, 2, ...)$ is defined by $a_k = a_1^{(k)}$. Two examples of sieves are considered. In the first example $b_k = k + 1$, in the second $b_k = a_k$. For $b_k = k + 1$ it is shown that $a_k = k^2/\pi + O(k^{4/3})$. For $b_k = a_k$ that $a_k \sim k \log k$. a_k is in this case for every λ asymptotic to the primes, and the proof has some similarity to that of the prime number theorem. Because of the great regularity of the process compared to the Erathostenes method, the asymptotic formula for a_k in this case is obtained more easily than that for the primes. A question by Viggo Brun has been answered by the authors, turning out to be a problem solvable by the method used in dealing with the case $b_k = k + 1$. A slight variant for the case $b_k = a_k$ has been studied by *Gardiner-Lazarus- Metropolis-Ulam* (Zbl 071.27002).

S.Selberg

Classification:
11M35 Other zeta functions