
Zbl 791.11051

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The distribution of quotients of small and large additive functions. II. (In English)

Bombieri, E. (ed.) et al., Proceedings of the Amalfi conference on analytic number theory, held at Maiori, Amalfi, Italy, from 25 to 29 September, 1989. Salerno: Universitá di Salerno, 83-93 (1992).

As usual, let $\omega(n)$, $\Omega(n)$ denote the number of prime factors of n without and with multiplicity, respectively, and $\beta(n)$, $B(n)$ be the corresponding functions for the sum of the prime factors of n. These functions have been studied, estimated and compared in various ways by the authors and by others. In particular, in [Boll. Un. Mat. Ital., VII. Ser. B 2, 79-97 (1988; Zbl 644.10033)] the second author investigated the distribution of the quotients $\Omega(n)/\omega(n)$, $B(n)/\beta(n)$ and showed that their values are usually close in a sense made precise.

The object of the current paper is to continue this investigation. Estimates are obtained for the number of integers n with $2 \le n \le x$ such that

(i) $$n \text{ is squarefree and } B(n)/\beta(n) = \Omega(n)/\omega(n);$$

(ii) $$B(n)/\beta(n) > \Omega(n)/\omega(n);$$

(iii) $$B(n)/\beta(n) = r\Omega(n)/\omega(n) \text{ for } r > 0,\ r \neq 1.$$

The results are proved using elementary and combinatorial methods.

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Classification:
11N37 Asymptotic results on arithmetic functions
11K65 Arithmetic functions (probabilistic number theory)
11N64 Characterization of arithmetic functions

Keywords:
sum of prime factors; quotients of additive functions; number of prime factors