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On locally repeated values of certain arithmetic functions. III. (In English)

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The reviewer showed [Mathematika 31, 141-149 (1984; Zbl 529.10040)] that the number of $n \leq x$ with $d(n) = d(n+1)$ is at least of order $x(\log x)^{-7}$. It is conjectured that the true order of magnitude is $x(\log\log x)^{-} = f(x)$, say. The principal result of this paper is that the number of solutions is $O(f(x))$. A similar result for the equation $\nu(n) = \nu(n+1)$ is also given, where $\nu(n)$ is the number of distinct prime factors of n. As far as lower bounds are concerned, it was shown in the second paper of this series [Acta Math. Hung. 49, 251-259 (1987; Zbl 609.10034)] that the inequality $|\nu(n) - \nu(n+1)| \leq 3$ has $\gg f(x)$ solutions $n \leq x$.

The paper uses elementary methods, employing a simple sieve result. The article concludes with some results about the equation $n + \nu(n) = m + \nu(m)$, and related topics.

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Classification:
11N37 Asymptotic results on arithmetic functions
11N05 Distribution of primes

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divisor function; values at consecutive integers; upper bounds; number of distinct prime factors