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Erdős, Paul; Freud, R.; Hegyvari, N.
Arithmetical properties of permutations of integers. (In English)
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Let $a_1, \ldots, a_n$ be a permutation of $1, \ldots, n$ and let $[a_i, a_j]$ denote the least common multiple of a_i and a_j. It is shown that

$$\min \max_{1 \le i < n} [a_i, a_{i+1}] = (1 + o(1)) \frac{n^2}{4 \log n},$$

where the minimum is taken over all permutations. This result is best possible since in any permutation there must be an a_i such that $[a_i, a_{i+1}] \geq (1+o(1)) \frac{n^2}{4 \log n}$. It is also shown that there is an infinite permutation $a_1, a_2, \ldots$ of the positive integers such that

$$[a_i, a_{i+1}] < i e^{c \sqrt{\log i} \log \log i}$$

for all i. Some results are also obtained for the greatest common divisor. See also following review.

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11B05 Topology etc. of sets of numbers
11A05 Multiplicative structure of the integers
11B75 Combinatorial number theory
05A05 Combinatorial choice problems

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permutations; density of sums; least common multiple; greatest common divisor