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Primality tests for numbers of the form $k \cdot 2^m \pm 1$,
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Abstract

Let $k, m \in \mathbb{Z}$, $m \geq 2$, $0 < k < 2^m$ and $2 \nmid k$. In the paper we give a general primality criterion for numbers of the form $k \cdot 2^m \pm 1$, which can be viewed as a generalization of the Lucas-Lehmer test for Mersenne primes. In particular, for $k = 3, 9$ we obtain explicit primality tests, which are simpler than current known results. We also give a new primality test for Fermat numbers and criteria for $9 \cdot 2^{4n+3} \pm 1$, $3 \cdot 2^{20n+6} \pm 1$ or $3 \cdot 2^{36n+6} \pm 1$ to be twin primes.