

Lucasian Primality Criterion for Specific Class of $7 \cdot 2^n + 1$

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Abstract: Conjectured polynomial time primality test for specific class of $7 \cdot 2^n + 1$ is introduced

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1 Introduction

In 1960 Kusta Inkeri provided unconditional , deterministic , lucasian type primality test for Fermat numbers [1] . In this note I present lucasian type primality test for specific class of numbers of the form $7 \cdot 2^n + 1$.

2 The Main Result

Definition 2.1. Let $P_m(x) = 2^{-m} \cdot \left((x - \sqrt{x^2 - 4})^m + (x + \sqrt{x^2 - 4})^m \right)$, where m and x are nonnegative integers .

Conjecture 2.1. Let $N = 7 \cdot 2^n + 1$ such that $n > 2$ and $n \equiv 0, 2 \pmod{4}$

$$\text{Let } S_i = P_2(S_{i-1}) \text{ with}$$
$$S_0 = \begin{cases} P_7(8), & \text{if } n \equiv 0 \pmod{4} \\ P_7(32), & \text{if } n \equiv 2 \pmod{4} \end{cases}$$

thus

$$N \text{ is prime iff } S_{n-2} \equiv 0 \pmod{N}$$

References

- [1] Inkeri, K., "Tests for primality", *Ann. Acad. Sci. Fenn.*, A I 279, 119 (1960).