

Compositeness Test for Repunits Base 3

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Abstract: Conjectured polynomial time compositeness test for numbers of the form $(3^p - 1)/2$ is introduced .

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1 Introduction

In 2010 Pedro Berrizbeitia ,Florian Luca and Ray Melham provided polynomial time compositeness test for numbers of the form $(2^p + 1)/3$, see Theorem 2 in [1] . In this note I present polynomial time compositeness test for numbers of the form $(3^p - 1)/2$ that is similar to the Berrizbeitia-Luca-Melham test .

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 $R = (3^p - 1)/2$ such that $p > 3$ and p is an odd prime .

Let $S_i = P_3(S_{i-1})$ with $S_0 = P_3(4)$, thus

If R is prime then $S_{p-1} \equiv P_3(4) \pmod{R}$

References

- [1] Pedro Berrizbeitia ,Florian Luca ,Ray Melham , "On a Compositeness Test for $(2^p + 1)/3$ ", *Journal of Integer Sequences*, Vol. 13 (2010), Article 10.1.7 .