# Compositeness Test for $N = 2 \cdot 3^n - 1$

**Predrag Terzić**

Novi Sad , Serbia

e-mail: pedja.terzic@hotmail.com

December 25 , 2014

**Abstract:** Conjectured polynomial time compositeness test for numbers of the form $2 \cdot 3^n - 1$ is introduced .

**Keywords:** Compositeness test , Polynomial time , Prime numbers .

**AMS Classification:** 11A51 .

## 1 Introduction

In 1969 Hans Riesel provided polynomial time primality test for numbers of the form $k \cdot 2^n - 1$ with $k$ odd , $k < 2^n$ and $n > 2$ , see Theorem 5 in [1] . In this note I present polynomial time compositeness test for numbers of the form $2 \cdot 3^n - 1$ .

## 2 The Main Result

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

**Conjecture 2.1.** *Let $N = 2 \cdot 3^n - 1$ such that $n > 1$ .*

$$\textit{Let } S_i = P_3(S_{i-1}) \textit{ with } S_0 = P_3(a) \textit{, where}$$
$$a = \begin{cases} 6, & \textit{if } n \equiv 0 \pmod{2} \\ 8, & \textit{if } n \equiv 1 \pmod{2} \end{cases}$$
$$\textit{thus ,}$$
$$\textit{If } N \textit{ is prime then } S_{n-1} \equiv a \pmod{N}$$

## References

[1] Riesel, Hans (1969) , ”Lucasian Criteria for the Primality of $N = h \cdot 2^n - 1$” , *Mathematics of Computation* (AmericanMathematical Society), 23 (108): 869-875 .