ON A STUDY OF BINOMIAL FORM TO THE NEW (S,T)-JACOBSTHAL SEQUENCE

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ABSTRACT. Many (s, t)-type of sequences has been introduced earlier such as (s, t)-Fibonacci sequence, (s, t)-Lucas sequence, (s, t)-Jacobsthal sequence, (s, t)-Jacobsthal-Lucas sequence etc. However in this article, we give a new type of (s, t)-Jacobsthal sequence $\langle U_n(s, t) \rangle_{n \in \mathbb{N}}$

 $U_n = iU_{n-1} + 2U_{n-2}, n \ge 2$ and $U_0 = s - 2t, U_1 = i(s-t)$

where $i = \sqrt{-1}$ and $s, t \in \mathbb{Z}^+$. Next we define a binomial form $\langle X_n(s,t) \rangle_{n \in \mathbb{N}}$ to the new (s,t)-Jacobsthal sequence and then some fundamental properties for the binomial form $\langle X_n(s,t) \rangle_{n \in \mathbb{N}}$ are obtained. Furthermore a new kind of matrix sequence $\langle Z_n(s,t) \rangle_{n \in \mathbb{N}}$ will be presented for the binomial form $\langle X_n(s,t) \rangle_{n \in \mathbb{N}}$.

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1. INTRODUCTION

In the mathematical world, the Fibonacci sequence (see [1]) have great importance and plays an important role almost in the every arena of science. Some sequences such as Jacobsthal and Jacobsthal-Lucas sequences etc have similar structure to the Fibonacci sequence and in another words, we can say that these sequences are the extensions or generalizations of Fibonacci sequence.

In 1961 Horadam [2] introduced the first ever generalization of Fibonacci sequence and denoted it by $\langle H_n \rangle$.

$$H_n = H_{n-1} + H_{n-2}, \quad n \ge 3 \text{ and } H_0 = p, \quad H_1 = p + q$$
 (1.1)