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SEVERAL GENERATING FUNCTIONS USING GENERALIZED LUCAS SEQUENCES

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Abstract: In this paper I have obtained the generating functions up to third order of generalized sequences defined by Goksal Bilgici. Also I have presented several generating functions of several sequences as particular cases.

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1. Introduction

Many authors [1, 3] generalized sequences differently. In [2] Goksal Bilgici defined generalized sequences $\{f_n\}_{n=0}^{\infty}$ and $\{l_n\}_{n=0}^{\infty}$. We can write l_n after some modification as follows:

$$l_n = 2al_{n-1} - (a^2 - b)l_{n-2} \qquad n \geq 2 \tag{1.1}$$

where $l_0 = 2$, $l_1 = 2a$.

Clearly, for $(a, b) = \left(\frac{1}{2}, \frac{5}{4}\right), \left(\frac{1}{2}, \frac{9}{4}\right), (1, 2)$ the sequence $\{l_n\}_{n=0}^{\infty}$ reduces the Classical Lucas, Jacobsthal-Lucas and Pell-Lucas sequences, respectively. In this note I have obtained the generating functions up to third order of generalized sequence and hence find

1. Generating functions up to third order of Lucas sequence.
2. Generating functions up to third order of Jacobsthal-Lucas sequence.