

# SUMS OF PRODUCTS OF THE TERMS OF THE GENERALIZED LUCAS SEQUENCE $\{V_{kn}\}$

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## Abstract

In this study we consider the generalized Lucas sequence  $\{V_n\}$  with indices in arithmetic progression. We also compute the sums of products of the terms of the Lucas sequence  $\{V_{kn}\}$  for positive odd integers  $k$ .

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## 1. Introduction

The binary linear recurrence  $W_n = W_n(a, b; p, q)$  is defined as follows for  $n > 1$ ,

$$W_n = pW_{n-1} + qW_{n-2},$$

where  $W_0 = a, W_1 = b$ .

The Binet formula for  $\{W_n\}$  is

$$(1.1) \quad W_n = A\alpha^n + B\beta^n,$$

where  $A = \frac{b-a\beta}{\alpha-\beta}$ ,  $B = \frac{a\alpha-b}{\alpha-\beta}$  and  $\alpha, \beta = \left(p \pm \sqrt{p^2 + 4q}\right) / 2$ .

For  $n > 1$  and a fixed positive integer  $k$ , the terms of  $\{W_{kn}\}$  satisfy the recursion [6, 7]:

$$W_{kn} = V_k W_{k(n-1)} - (-q)^k W_{k(n-2)},$$

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