

# On generalized Horadam sequence

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In this talk, we consider a generalization of Horadam sequence, called as bi-periodic Horadam sequence  $\{w_n\}$ , which is defined by the recurrence relation:

$$w_n = a^{\xi(n+1)}b^{\xi(n)}w_{n-1} + cw_{n-2}, \quad n \geq 2,$$

with arbitrary initial values  $w_0, w_1$  and nonzero real numbers  $a, b, c$ . Here  $\xi(n) = [1 - (-1)^n] / 2$ , that is,  $\xi(n) = 0$  when  $n$  is even and  $\xi(n) = 1$  when  $n$  is odd. This sequence emerges as a natural extension of the classical Horadam sequence when  $a = b$ . We provide a combinatorial interpretation for the bi-periodic Horadam numbers by using the weighted tilings approach. Additionally, we introduce bi-periodic incomplete Horadam numbers and bi-periodic hyper Horadam numbers, and give a relationship between them.