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2-adic properties of generalized Fibonacci sequences

Let T_n denote the generalized Fibonacci number of order k defined by the recurrence $T_n = T_{n-1} + T_{n-2} + \cdots + T_{n-k}$ for $n \geq k$, with initial conditions $T_0 = 0$ and $T_i = 1$ for $1 \leq i < k$. Motivated by some recent conjectures of Lengyel and Marques, we establish the 2-adic valuation of T_n , settling one conjecture affirmatively and one negatively. We discuss the computational issues that arise and applications to Diophantine equations involving (T_n) and $(T_n \pm 1)$.