Abstract

This work generalizes results on exact divisibility of powers of the Fibonacci number $F_n^k$ into another Fibonacci number $G_k(n)$ defined iteratively by $G_1(n) = F_n$ and $G_k(n) = F_n G_{k-1}(n)$ for $k \geq 2$. In particular, we prove analogous results on nondegenerate Lucas sequences by providing explicit formulas for $p$-adic valuation of iterative terms in these sequences. The proof makes use of recent results by Sanna regarding the $p$-adic valuation of Lucas sequences.