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*p-adic Valuation of Lucas Iteration Sequences*,  
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**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  $G_k(n) = F_{nG_{k-1}(n)}$  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.