Abstract

We give one parameter generalizations of the Fibonacci and Lucas numbers denoted by $\{F_n(\theta)\}$ and $\{L_n(\theta)\}$, respectively. We evaluate the Hankel determinants with entries $\{1/F_{j+k+1}(\theta) : 0 \leq i, j \leq n\}$ and $\{1/L_{j+k+1}(\theta) : 0 \leq i, j \leq n\}$. We also find the entries in the inverse of $\{1/F_{j+k+1}(\theta) : 0 \leq i, j \leq n\}$ and show that all its entries are integers. Some of the identities satisfied by the Fibonacci and Lucas numbers are extended to more general numbers. All integer solutions to three Diophantine equations related to the Pell equation are also found.