

Soowhan Yoon

Analytic Connection Between the Fibonacci Sequence and Diagonal Sums of Binomial Coefficients,

Fibonacci Quart. **59** (2021), no. 4, 349–361.

Abstract

Lucas noted in the 19th century that the Fibonacci sequence appears on the diagonals of Pascal's triangle. On the other hand, Binet's formula provides a closed form expression for the Fibonacci sequence using a linear combination of two geometric sequences. Both representations inspire one to produce an analytic function on the complex domain with the Fibonacci recurrence. As the main result, this article proves the equality of the two formulas for the same analytic function obtained by extending those representations. The proof utilizes polynomial sequences of binomial type, which are studied in the umbral calculus.