Alexandre Gueganic, Granger Carty, Yujin H. Kim, Steven J. Miller, Alina Shubina, Shannon Sweitzer, Eric Winsor, and Jianing Yang

Abstract

An equivalent definition of the Fibonacci numbers is that they are the unique sequence such that every integer can be written uniquely as a sum of nonadjacent terms. We can view this as we have bins of length 1, we can take at most one element from a bin, and if we choose an element from a bin we cannot take one from a neighboring bin. We generalize to allowing bins of varying length and restrictions as to how many elements may be used in a decomposition. We derive conditions on when the resulting sequences have uniqueness of decomposition, and (similar to the Fibonacci case) when the number of summands converges to a Gaussian; the main tool in the proofs here is the Lyaponuv Central Limit Theorem.