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 Lyapunov Central Limit Theorem.