1093-60-124   **Steven J Miller*** (`sjm1@williams.edu`), 18 HOXSEY ST, WILLIAMSTOWN, MA 01267. *Mind the Gap: Distribution of Gaps in Generalized Zeckendorf Decompositions.*

Zeckendorf proved that any integer can be decomposed uniquely as a sum of non-adjacent Fibonacci numbers, F_n. Using continued fractions, Lekkerkerker proved the average number of summands of an $m \in [F_n, F_{n+1})$ is essentially $n/(\phi^2 + 1)$, with ϕ the golden ratio. Miller-Wang generalized this by adopting a combinatorial perspective, proving that for any positive linear recurrence the number of summands in decompositions for integers in $[A_n, A_{n+1})$ converges to a Gaussian distribution as $n \to \infty$.

We prove the probability of a gap larger than the recurrence length converges to decaying geometrically, and that the distribution of the smaller gaps depends on the coefficients of the recurrence. These results hold both for the average over all $m \in [A_n, A_{n_1})$, as well as holding almost surely for the gap measure associated to individual m. The techniques can also be used to determine the distribution of the longest gap between summands (which is similar to the distribution of the longest gap between heads in tosses of a biased coin), as well as for far-difference representations (where positive and negative summands are allowed). This is joint work with Amanda Bower, Louis Gaudet, Rachel Insoft, Shiyu Li and Phil Tosteson. (Received August 08, 2013)