Diophantine equations with generalized Fibonacci numbers

Florian Luca

Let $k \geq 2$. The k-generalized Fibonacci numbers $\{F_n^{(k)}\}_{n \geq -(k-1)}$ start with $k-1$ zeros followed by one 1 and obey the recurrence

$$F_{n+k}^{(k)} = F_{n+k-1}^{(k-1)} + \cdots + F_n^{(k)} \quad \text{for all} \quad n \geq -(k-1).$$

In my talk, I will present various Diophantine results concerning the sequences $\{F_n^{(k)}\}_{n \geq 1}$. For example, the only repdigits with at least two distinct digits amongst all the generalized Fibonacci numbers are $F_{10}^{(2)} = 55$ and $F_7^{(3)} = 44$. The largest *interesting* double occurrence of a number in two different Fibonacci sequences is $F_{11}^{(7)} = F_{12}^{(3)} = 504$. The proofs of these results use a Binet formula for $F_n^{(k)}$ due to Dresden, linear forms in logarithms of algebraic numbers due to Matveev, and some computations. These results have been obtained jointly with Jhon Jairo Bravo Grijalba and will be part of his Ph.D. dissertation.