Avoidance of Partitions of a Three Element Set

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Klazar has defined pattern avoidance for set partitions, which is analogous to the notion of pattern avoidance for permutations. This notion has been further studied by Sagan. In this talk we will provide enumerative results for set partitions which do not contain copies of partitions of a 3-element set, as was done by Simion and Schmidt. In particular we will show that the number of partitions of $[n]$ avoiding the partitions $13/2$ is 2^{n-1} and that the number of partitions of $[n]$ avoiding both $13/2$ and 123 is the nth Fibonacci number.

We will discuss enumerative results for set partitions restricted by generalized set partition patterns, which are analogous to the generalized permutation patterns of Babson and Steingrímsson. In the spirit of Babson and Steingrímsson we will encode some set partition statistics in terms of the generalized patterns.

Finally, we will discuss joint work with Sagan where we study q-Fibonacci numbers, which naturally arise from the study of statistics on the set of partitions of $[n]$, which avoid $13/2$ and 123. These q-Fibonacci numbers are related to the q-Fibonacci numbers and q-Fibonacci polynomials of Carlitz and Cigler. We will also show how many Fibonacci identities generalize to these q-Fibonacci numbers.