Analysis Seminar

Enumeration of the set of permutations avoiding the pattern 1342

By

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Abstract: A permutation of length k is said to appear as a pattern in a longer permutation of length n if the latter has a subsequence of length k that is order isomorphic to the shorter one. Otherwise, we say that the longer permutation avoids the shorter one as a pattern. Let S_n(tau) denote the set of all permutations of length n that avoids the pattern tau. Consider the following equivalence relation on S_k: for any rho and tau in S_k, rho ~ tau iff |S_n(rho)|=|S_n(tau)| for all n. Two patterns are called Wilf-equivalent if they are in the same equivalence class under this relation. Determining the number of Wilf classes and enumerating them for S_k for any k \geq 3 have motivated numerous enumerative techniques. It is known that S_3 has only one Wilf class which is enumerated by Catalan numbers. S_4 has 3 Wilf classes represented by 1234, 1324, and 1342. Gessel enumerated the class of 1234 in 1990. Bona enumerated the class of 1342 in 1997. The enumeration of class 1324 is a long-standing open question. In my talk, I present the main ideas of the proof of Bona.

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