Permutations with exactly r occurrences of a length three pattern

Brian Nakamura (Rutgers University)

We consider the problem of enumerating permutations that contain exactly r occurrences of a pattern. In previous work, Markus Fulmek gave an approach to find such generating functions for length three patterns by translating permutations into generalized Dyck paths where certain jumps are allowed. In particular, Fulmek was able to find the generating functions for the $r = 1$ and $r = 2$ cases of 312 as well as the $r = 1$ and $r = 2$ cases of 321. In this talk, we discuss Fulmek's approach and show some ways how it can be automated and extended for more occurrences.