

On permutation boxed mesh patterns

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Mesh patterns are a generalization of vincular patterns. Mesh patterns were introduced by Branden and Claesson to provide explicit expansions for certain permutation statistics as, possibly infinite, linear combinations of (classical) permutation patterns.

We introduce the notion of a boxed mesh pattern and study avoidance of these patterns on permutations. We prove that the celebrated former Stanley-Wilf conjecture is not true for all but eleven boxed mesh patterns; for seven out of the eleven patterns the former conjecture is true, while we do not know the answer for the remaining four (length-four) patterns. Moreover, we show that an analogue of a well-known theorem of Erdos and Szekeres does not hold for boxed mesh patterns of lengths larger than 2. Finally, we discuss enumeration of permutations avoiding simultaneously two or more length-three boxed mesh patterns, where we meet generalized Catalan numbers.

This is joint work with Sergey Avgustinovich and Alexander Valyuzhenich.