

Matchings Avoiding Partial Patterns

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Abstract: We show that matchings avoiding certain partial patterns are counted by the 3-Catalan numbers. We give a characterization of 12312-avoiding matchings in terms of restrictions on the corresponding oscillating tableaux. We also find a bijection between Schröder paths without peaks at level one and matchings avoiding both patterns 12312 and 121323. Such objects are counted by the super-Catalan numbers or the little Schröder numbers. A refinement of the super-Catalan numbers is obtained by fixing the number of crossings in the matchings. In the sense of Wilf-equivalence, we find that the patterns 12132, 12123, 12321, 12231, 12213 are equivalent to 12312.

AMS Classification: 05A05, 05C30.

Keywords: Generating function, generating tree, matching, ternary tree, super-Catalan number, oscillating tableau.

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