

**Connecting Concepts to Develop New Methods of Deriving Combinatorial Formulas**  
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We present a method to obtain the number of ascents and descents in all derangements of order  $n$ , using the concept of matrix of forbidden pairs. We then use a specific representation of permutations to derive combinatorial formulas related to average behavior of algorithms. Such formulas could be used to better analyze or compare sorting algorithms.

Keywords: permutation, derangement, analysis of algorithms