

Fast RSK correspondence by doubling search

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Abstract. The Robinson–Schensted–Knuth (RSK) correspondence is a fundamental concept in combinatorics and representation theory. It is defined as a certain bijection between permutations and pairs of Young tableaux of a given order. We consider the RSK correspondence as an algorithmic problem, along with the closely related k -chain problem. We give a simple, direct description of the symmetric RSK algorithm, which is implied by the k -chain algorithm of Felsner and Wernisch. We also show how the doubling search of Bentley and Yao can be used as a subroutine by the symmetric RSK algorithm, replacing the default binary search. Surprisingly, such a straightforward replacement improves the asymptotic worst-case running time for the RSK correspondence that has been best known since 1998. A similar improvement also holds for the average running time of RSK on uniformly random permutations.

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