

RSK tableaux of boolean and fully commutative permutations

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Abstract

We generalize a result of Mazorchuk and Tenner, showing that the “run” statistic influences the shape of the RSK tableaux of an arbitrary permutation. We define and construct the “canonical reduced word” of a boolean permutation, and show that the RSK tableaux for that permutation can be read off directly from this reduced word. We also describe those tableaux that can correspond to boolean permutations in terms of “uncrowded sets.” We then extend this work to fully commutative permutations, showing that each fully commutative permutation has a well-defined “boolean core,” related to the right weak order. The contents of the second row of the insertion tableaux of fully commutative permutations are partially ordered as subsets, with respect to the right weak order. We explore the partial order of these subsets, with particular interest in when they change from uncrowded to crowded. This is joint work with Gunawan, Russell and Tenner, based on recent work in arXiv:2207.05119 and arXiv:2212.05002.