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Operators of equivalent sorting power and related Wilf-equivalences

We study partial sorting operators $\mathbf{A}$ on permutations that are obtained composing Knuth's stack sorting operator $\mathbf{S}$ and the reverse operator $\mathbf{R}$, as many times as desired. For any such operator $\mathbf{A}$, we provide a statistics-preserving bijection between the set of permutations sorted by $\mathbf{S}\circ\mathbf{A}$ and the set of those sorted by $\mathbf{S}\circ\mathbf{R}\circ\mathbf{A}$. This is based on an apparently novel bijection between permutations avoiding the pattern 231 and those avoiding 132 which preserves many permutation statistics and has unexpected consequences in terms of Wilf-equivalences.

Joint work with Michael Albert (University of Otago, New Zealand).