

Permutation Regularity Lemma

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We introduce a permutation analogue of the celebrated Szemerédi Regularity Lemma, and derive a number of consequences. This tool allows us to provide a structural description of permutations which avoid a specified pattern, a result that permutations which scatter small intervals contain all possible patterns of a given size, a proof that every permutation avoiding a specified pattern has a nearly monotone linear-sized subset, and a “thin deletion” result. We also show how one can count sub-patterns of a permutation with an integral, and relate our results to permutation quasirandomness in a manner analogous to the graph-theoretic setting.