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Crossings and nestings of two edges in set partitions

Let π and λ be two set partitions with the same number of blocks. Assume π is a partition of $[n]$. For any integer $l, m \geq 0$, let $\mathcal{T}(\pi, l)$ be the set of partitions of $[n+l]$ whose restrictions to the last n elements are isomorphic to π, and $\mathcal{T}(\pi, l, m)$ the subset of $\mathcal{T}(\pi, l)$ consisting of those partitions with exactly m blocks. Similarly define $\mathcal{T}(\lambda, l)$ and $\mathcal{T}(\lambda, l, m)$. We prove that if the statistic cr (ne), the number of crossings (nestings) of two edges, coincides on the sets $\mathcal{T}(\pi, l)$ and $\mathcal{T}(\lambda, l)$ for $l = 0, 1$, then it coincides on $\mathcal{T}(\pi, l, m)$ and $\mathcal{T}(\lambda, l, m)$ for all $l, m \geq 0$. These results extend the ones obtained by Klazar on the distribution of crossings and nestings for matchings.