

Covering all n -permutations with $(n + 1)$ -permutations

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Let Σ_n be the set of all permutations on $[n] := \{1, 2, \dots, n\}$. We denote by κ_n the smallest cardinality of a subset \mathcal{A} of Σ_{n+1} that "covers" Σ_n , in the sense that each $\pi \in \Sigma_n$ may be found as an order-isomorphic subsequence of some π' in \mathcal{A} . What are general upper bounds on κ_n ? If we randomly select ν_n elements of Σ_{n+1} , when does the probability that they cover Σ_n transition from 0 to 1? Can we provide a fine-magnification analysis that provides the "probability of coverage" when ν_n is around the level given by the phase transition? In this talk we answer these questions and raise others. This is joint work with Bill Kay (USC, Columbia), Taylor Allison (NC State), and Katie Hawley (Harvey Mudd) – and partially answers a question raised by Robert Brignall at last year's PP Conference.