

Transition between characters of classical groups, decomposition of Gelfand-Tsetlin patterns and last passage percolation

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Abstract: We study the combinatorial structure of Schur polynomials of type A, B, C and D (i.e., irreducible characters of classical groups). Perturbing the expressions of these characters as generating functions of Gelfand-Tsetlin patterns, we produce two families of symmetric polynomials that interpolate between characters of type C and type B and between characters of type B and type D. Using a combinatorial bijection between Gelfand-Tsetlin patterns, we prove a determinantal formula for the polynomials of the first family and identify them as a one-parameter specialization of Koornwinder polynomials. We next present a method of Gelfand-Tsetlin pattern decomposition to establish identities between all these polynomials that, in the case of characters, can be viewed as branching rules. We finally mention our probabilistic motivation, which is related to last passage percolation models with symmetries and to random matrix distributions.