
Total positivity for the Lagrangian Grassmannian

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Abstract

The positroid decomposition of the Grassmannian refines the well-known Schubert decomposition, and has a rich combinatorial structure. There are a number of interesting combinatorial posets which index positroid varieties, just as Young diagrams index Schubert varieties. In addition, Postnikov's boundary measurement map gives a family of parametrizations for each positroid variety. The domain of each parametrization is the space of edge weights of a weighted planar network. The positroid stratification of the Grassmannian provides an elementary example of Lusztig's theory of total nonnegativity for partial flag varieties, and has remarkable applications to particle physics. We generalize the combinatorics of positroid varieties to the Lagrangian Grassmannian, the moduli space of maximal isotropic subspaces with respect to a symplectic form.

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