Order Filter Model for Minuscule Plücker Relations

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Abstract

The Plücker relations which define the Grassmann manifolds as projective varieties are well known. Grass- mann manifolds are examples of minuscule flag manifolds. We study the generalized Plücker relations for minuscule flag manifolds independent of Lie type. To do this we combinatorially model the Plücker coordinates based on Wild- berger's construction of minuscule Lie algebra representations; it uses the colored partially ordered sets known as minuscule posets. We obtain, uniformly across Lie type, descriptions of the Plücker relations of "extreme weight". We show that these are "supported" by "double-tailed diamond" sub-lattices of minuscule lattices. From this, we obtain a complete set of Plücker relations for the exceptional minuscule flag manifolds. These Plücker relations are straightening laws for their coordinate rings.

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