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"Enumeratively identical lattices: Subgroups and invariant subspaces"

Subgroups of a finite abelian group G, ordered by inclusion, are the elements of a partially ordered set that may be studied with a wide variety of combinatorial techniques (including the algebra of symmetric functions and the combinatorial theory of shellable posets). If the isomorphism type of G is specified by a partition of n, then this poset shares enumerative properties with the poset of T-invariant subspaces of the vector space of dimension n over the field with p elements, where T is a nilpotent transformation whose Jordan blocks have sizes the parts of the partition.

This talk compares and contrasts these two posets. In particular, we discuss the recent result obtained with Karl that these two posets are isomorphic if the third largest part of the partition is at most one. To illustrate the classical result that these two posets are otherwise non-isomorphic, we have spectacular pictures created with Burgiel of the case when p=2 and the partition is 222.