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On Hilbert function for subspace arrangements

Subspace arrangements in a vector space, i.e., a finite collection of linear spaces in projective space, are objects of crucial interest. Still, we do not know much about them.

For example, we know the Hilbert polynomial of subspace arrangements (Derksen) and we have information on their equation (Sidman), but their Hilbert function is not known in general.

The Hilbert function of subspace arrangements is only known for low dimensional cases, namely for lines and points, i.e., subspaces of dimension at most two. The case of points is almost trivial, but the lines case is not; a solution was given by Hartshorne–Hirschowitz in 1981.

In collaboration with M. V. Catalisano and A. V. Geramita, we are investigating the next interesting situation where planes also come into the picture.

In the talk, I will present some results in the case of P^4 where we consider a collection of lines and exactly one plane.