Multiplicities of Classical Varieties

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The j-multiplicity plays an important role in the intersection theory of Stückrad-Vogel cycles, while recent developments confirm the connections between the ϵ-multiplicity and equisingularity theory. We establish, under some constraints, a relationship between the j-multiplicity of an ideal and the degree of its fiber cone. As a consequence, we are able to compute the j-multiplicity of all the ideals defining rational normal scrolls. By using the standard monomial theory, we can also compute the j- and ϵ-multiplicity of ideals defining determinantal varieties: The found quantities are integrals which, quite surprisingly, are central in random matrix theory. This is joint work with Jonathan Montaño and Matteo Varbaro.

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