Algebra Seminar

An arithmetic count of the lines meeting four lines in P3

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Abstract: We enrich the classical count that there are two complex lines meeting four lines in space to an equality of isomorphism classes of bilinear forms. For any field k, this enrichment counts the number of lines meeting four lines defined over k in P3, with such lines weighted by their fields of definition together with information about the cross-ratio of the intersection points and spanning planes. We generalize this example to an infinite family of such enrichments, obtained using an Euler number in A1 -homotopy theory. The classical counts are recovered by taking the rank of the bilinear forms.

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