SEMINARIO DI GEOMETRIA

13 settembre 2017, h.15.00-16.00

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Spaces of matrices of constant rank, vector bundles, cones of morphisms, and truncated graded modules

A space of matrices of constant rank is a vector subspace V, say of dimension $n+1$, of the set of matrices of size $a \times b$ over a field k, such that any nonzero element of V has fixed rank r. It is a classical problem to look for examples of such spaces of matrices, and to give relations among the possible values of the parameters a, b, r, n.

In this talk I will report on several joint projects with D. Faenzi, P. Lella, and E. Mezzetti, introducing new methods to classify and produce examples of such spaces. The techniques that I will explain involve vector bundles on projective spaces, and in particular globally generated bundles and instanton bundles, the structure of the derived category of $\mathbb{P}^n$, as well as finitely generated graded modules over the ring of polynomials $k[x_0, ..., x_n]$.