

P.R.A.G.MAT.I.C. 2009

Vector bundles, from classical techniques to new perspectives

The goal is to study vector bundles on projective varieties and their applications, using old and new approaches. A lot of open problems on this subject will be given during the period.

School topics. Construction of vector bundles, cohomological characterization of vector bundles with and without intermediate cohomology, stability and exceptionality of vector bundles, moduli problems, toric and homogeneous bundles, group actions, and so on;

Tools proposed. Classical methods in vector bundle theory and in representation theory, representation of quivers, derived categories, multilinear algebra (including hyperdeterminants), toric and discrete techniques and more.

Background. The basics of Algebraic Geometry, essentially the concept of scheme, morphism between schemes, vector bundles, cohomology of sheaves, as supplied for example by Hartshorne's book suffices as a foundation for this school. Some familiarity with Commutative Algebra, as developed in Bruns-Herzog's, is helpful and the rudiments on Ext and Tor contained in every introduction to Homological Algebra will be used freely.