

Arithmetic aspects of complex algebraic geometry

Complex algebraic geometry is concerned with the geometric, topological and analytic aspects of solutions over the complex numbers to polynomial equations. Recently it has come to be understood that, even if one is only interested in the geometry over the complexes, as soon as one leaves the classical situation of essentially one equation arithmetic considerations necessarily enter.

Lecture I: An elementary geometric problem leads to $K_2(\mathbf{C})$

This talk will assume only elementary one variable complex analysis.

Lecture II: Hodge theory and the breakdown of the classical picture in higher codimension

This talk will review basic Hodge theory and the classical Hodge-theoretic invariants of algebraic cycles. It will then explain that these invariants are insufficient for configurations of points on algebraic surfaces.

Lecture III: Arithmetic-Hodge theoretic invariants

This talk will introduce these invariants and illustrate how they lead to a complete set of invariants for configurations of points on surfaces. We will also sketch how these invariants may be defined in general.