

MATH-694 MATH FOUND THEOR PHYSICS

My goal is to discuss algebraic varieties which are of interest to the physics of string theory.

I will begin by discussing the birational classifications of complex algebraic surfaces: we will do so by following the "minimal model program", which can be also applied in dimension higher than 2.

We will then focus on some surfaces which are of particular interest to the physics of string theory: del Pezzo, K3, elliptic and abelian surfaces. We will discuss the higher dimensional generalizations of these surfaces (including Fano and Calabi-Yau varieties). We will also study singularities (A-D-E and beyond) on these varieties and their interpretations in physics (gauge theory, anomalies and realistic models).