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RESOLUTION OF SINGULARITIES: AN INTRODUCTION TO ALGEBRAIC GEOMETRY

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Algebraic geometry is the study of solutions to systems of polynomial equations over a commutative ring, usually a field. We call the set of solutions a **variety**. These varieties have additional structures, which may depend on the commutative ring.

One area of active research is the resolution of singularities. Given a variety X with singularities, the motivating question is: Does there exist a *smooth* variety Y and a projective birational map $Y \xrightarrow{\pi} X$ such that π is an isomorphism away from the singular locus $Sing(X)$ of X ? Another important problem related to resolution is principalization of ideals. For our thesis, we gave a simple and constructive algorithm for principalization of monomial ideals.

Our aim in this talk is to introduce the audience to algebraic geometry by describing the problem of resolution for curves and surfaces, including our algorithm for principalization of monomial ideals, and to give some examples.