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In algebraic geometry, the basic objects of study are "algebraic varieties", or simply "varieties". These are geometric objects defined by polynomials. Some examples of varieties are circles, parabolas, and spheres. Algebraic geometry is the study of the properties of varieties through algebraic techniques applied to polynomials. A modern approach to algebraic geometry is to analyze functions between varieties in order to garner information about varieties themselves. Correct functions between varieties are those defined by polynomials. The simpler a function is, the simpler its analysis is going to be. An example of a simple function is a function defined by monomials - polynomials that consist of only one term. Let us call these functions "monomial" functions.

There do exist functions that are not monomial. However, an important question is whether a function f between two varieties X and Y can be "modified" into a monomial one. Here "modified" has a precise technical meaning, but it can be thought of as transforming f, X and Y as little as possible to achieve the objective. There has been some significant progress on this question, especially by Dale Cutkosky, but the general question remains unresolved.

In my dissertation, I formulate a special class of functions and ask whether functions of this class can be modified into monomial functions. These functions have some of the nice properties of monomial functions, but are themselves not monomial. They can be thought of as lying somewhere between arbitrary functions and monomial functions. The result I obtain says that any function f between X and Y that belongs to the above special class can be modified into a monomial function when Y is a surface. A surface is a variety of dimension 2 such as a doughnut, or a tennis ball.

The significance of this result is that it enlarges the class of functions which we know can be modified into monomial functions.