

Working in geometry with radicals of polynomials

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In some applications, one associates an algebraic variety to the problem to be studied. Examples of this claim can be found, for instance, in geometric design or when solving differential equations. Furthermore, the associated algebraic variety is assumed to be rational, and hence representable by means of rational functions. This is a limitation of the feasibility of the application, since the class of rational varieties may turn to be small for the practical purposes. To overcome this difficulty one may use approximations or, alternatively, enlarge the family of functions allowed to be used in the parametric representation of the geometric object, for instance by introducing radicals of polynomials. This is the theoretical frame of this talk

The plan for this talk is to introduce the notion of radical parametrization as well as the associated concept of radical variety. Additionally, we will introduce a second, auxiliary, variety, named the tower variety. In addition, we will study some of their fundamental properties and algorithms related to them. To illustrate the radical varieties, we will show how they allow to simplify, and sometimes solve, certain types of differential equations.