SEMINARIO

Pablo Mazón González

CUNEF Universidad

Birational Biquadratic Maps

Abstract: We provide effective methods to construct birational biquadratic maps. Our approach relies on control points and weights, which provide the flexibility needed to manipulate these transformations in applications. We prove an explicit formula for these maps involving an exterior product of two pencils of conics. We use our formula to describe the geometry of the maps by means of a Schur vector space. In particular, our formula recovers the fact that a birational biquadratic map is the composition of a bilinear birational map and a quadratic Cremona transformation. Additionally, we provide explicit generators for the defining ideal of the Rees algebra, in particular, the syzygies of the defining polynomials of the map. Finally, we describe the geometric constraints on the control points that are necessary for birationality, and prove that birationality can be described using a symmetric tensor with partially symmetric rank one.

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