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On the unirationality of conic bundles with eight singular fibers

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Abstract

We investigate the problems of unirationality and rationality for conic bundles $S \rightarrow \mathbb{P}^1$ over a \mathbb{C} field k , which can be described as the zero locus of a hypersurface in the projectivization of a rank-3 vector bundle over \mathbb{P}^1 . Conic bundles can be classified by the degree d of the discriminant, i.e. the number of points on the base where the corresponding fiber is not a smooth conic. Unirationality for $d < 8$ was already established by Kollár and Mella in 2014, while the case for general d remains open. In this work we focus on the next case $d=8$, and explicitly show that for all four possible types of such conic bundles S , the set of unirational ones forms an open subset of the parameter space. We also examine algebraic constraints, depending on the base field k , under which a general S is not rational over k .

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