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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⟶P1 over a C1 field k, which can be described as the zero locus of a hypersurface in the projectivization of a rank-3 vector bundle over P1. 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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