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Sommario/riassunto

"The celebrated Zariski Cancellation Problem asks as to when the existence of an isomorphism X An X An for (affine) algebraic varieties X and X implies that X X. In this paper we provide a criterion for cancellation by the affine line (that is, n 1) in the case where X is a normal affine surface admitting an A1-fibration X B with no multiple fiber over a smooth affine curve B. For two such surfaces X B and X B we give a criterion as to when the cylinders X A1 and X A1 are isomorphic over B. The latter criterion is expressed in terms of linear equivalence of certain divisors on the Danielewski-Fieseler quotient of X over B. It occurs that for a smooth A1-fibered surface X B the cancellation by the affine line holds if and only if X B is a line bundle, and, for a normal such X, if and only if X B is a cyclic quotient of a line bundle (an orbifold line bundle). If X does not admit any A1-fibration over an affine base then the cancellation by the affine line is known to hold for X by a result of Bandman and Makar-Limanov. If the cancellation does not hold then X deforms in a non-isotrivial family of A1-fibered surfaces B with cylinders A1 isomorphic over B. We construct such versal deformation families and their coarse moduli spaces provided B does not admit nonconstant invertible functions. Each of these coarse moduli spaces has infinite number of irreducible components of growing dimensions; each component is an affine variety with quotient singularities. Finally, we analyze from our viewpoint the examples of non-cancellation constructed by Danielewski, tom Dieck, Wilkens, Masuda and Miyanishi, e.a"--