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Quotient surface singularities and their deformations. (English summary)

Singularity theory (Trieste, 1991), 1–54, *World Sci. Publ.*, *River Edge*, *NJ*, 1995.

This survey reviews some new developments (as of 1991) in the deformation theory of two-dimensional quotient singularities; at the same time it gives a good general introduction to the subject of normal surface singularities.

In the first section it is shown how to derive the classification of two-dimensional quotients from general principles, starting with a subgroup of the group of biholomorphisms on a complex analytic space. As a specific example the equations for two-dimensional quotients are written down in a way which is useful for the description of their deformations, using a clever pictorial scheme. For each component of the reduced base space there is a preferred way of writing the equations.

The sections with generalities on resolutions and deformations of surface singularities contain a proof of the rationality of quotient surface singularities. Versal deformations, cotangent cohomology, simultaneous resolution, the Artin component are among the subjects.

The last two sections sketch the applications to the deformation theory of (cyclic) quotients. In his Hamburg thesis, Jürgen Arndt ["Verselle Deformationen zyklischer Quotientensingularitaetes", Dissertation, Univ. Hamburg, Hamburg, 1988; Zbl 643.32007] gave an algorithm to compute the versal deformation for the cyclic quotients. Its working is shown in the example of the cone over the rational normal curve of degree four. Arndt's conjecture on the number of components was proved by the reviewer [in *Singularity theory and its applications, Part I (Coventry, 1988/1989)*, 302–319, Lecture Notes in Math., 1462, Springer, Berlin, 1991; MR1129040] using Kollár and Shepherd-Barron's description of components by certain partial resolutions. The last sections concern the results of Behnke and J. Christophersen [Amer. J. Math. **116** (1994), no. 4, 881–903; MR1287942] on the monodromy covering of the components.

{For the collection containing this paper see MR1378393}

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