

Semistable degenerations of Fano varieties

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Consider a family of projective varieties over a curve germ. We will focus on so called semistable families. By the semistable reduction theorem any family whose generic fiber is smooth is birational to a semistable family after a finite base change. We say that the special fiber of such family is a semistable degeneration of its generic fiber. A natural invariant of the special fiber is its dual complex. For example, due to Kulikov there is a characterization of semistable degenerations of K3 surfaces in terms of its dual complexes. Analogous result was obtained by Fujita for del Pezzo surfaces. We prove that if every fiber of a semistable family is Fano then the dual complex of the special fiber is a simplex of bounded dimension. We show that, in contrast to the case of K3 surfaces, the monodromy around the special fiber is always trivial for semistable degenerations of del Pezzo surfaces. We also discuss maximal degenerations of Fano varieties and prove that they are unique in dimensions not greater than 3.