106. *Invariance of the Plurigenera of Algebraic Varieties under Minimal Model Conjectures*

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The purpose of this paper is to outline our recent results (see Theorems 1, 2 in § 3) on the behavior of plurigenera under projective deformation, provided that the minimal model conjectures (see § 1) are true. Here all the varieties are defined over the field of complex numbers. Details will be published elsewhere.

§ 1. Let X be a complete algebraic variety. A divisor D on X is called *nef*, if $D\cdot C\geqq 0$ for any curve C on X. The *numerical Kodaira dimension* for a nef Cartier divisor D is defined by

$$\nu(D):=\kappa_{num}(D):=\max\{d\,|\,D^d\not\approx 0\}.$$

If $\kappa(D)=\nu(D)$, D is called *good*. If $\kappa(D)=\dim X$ or $\nu(D)=\dim X$, then $\kappa(D)=\nu(D)=\dim X$. Such a D is called *big*.

For a normal variety X, K_X denotes the *canonical divisor class* of X and ω_X denotes the *dualizing sheaf* of X. For a Weil divisor D, if mD is Cartier for some integer m, then D is called ***Q**-Cartier*. If K_X is $\boldsymbol{Q}$-Cartier, then X is called a ***Q**-Gorenstein* variety. If any Weil divisors are $\boldsymbol{Q}$-Cartier, X is called ***Q**-factorial*. For a $\boldsymbol{Q}$-Gorenstein variety X, the smallest positive integer r such that rK_X is Cartier is called the index of X, denoted by index(X). Let X be a normal $\boldsymbol{Q}$-Gorenstein variety. For some (any) resolution $d: Y\to X$, if $K_Y=d^*K_X+\sum a_iE_i$, where $\sum E_i$ is a normal crossing d-exceptional divisor, then the singularity of X is called *terminal, canonical* or *log-terminal* according as $a_i>0$, $a_i\geqq 0$ or $a_i>-1$, for all i, (see [2] and [5]).

Let X be a normal projective variety with only canonical singularities. For an extremal ray R on X, there exists a morphism $\mathrm{cont}_R: X\to V$ called a contraction of R. For definitions and details, refer to Kawamata [2]. The type of $\mathrm{cont}_R: X\to V$ is one of the following cases:

(i) $\dim X>\dim V$ and cont_R has connected fibers.

(ii) cont_R is a birational morphism not isomorphic in codimension 1.

(iii) cont_R is a birational morphism isomorphic in codimension 1.

In the case (i), a general fiber F of the cont_R is a $\boldsymbol{Q}$-Fano variety, i.e., $-K_F$ is an ample $\boldsymbol{Q}$-Cartier divisor. In particular, $\kappa(X)=-\infty$. In the case (ii), if X has only $\boldsymbol{Q}$-factorial terminal singularities, then the