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The volume of an isolated singularity

Sebastien Boucksom, Tommaso De Fernex, Charles Favre

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We introduce a notion of volume of a normal isolated singularity that generalizes Wahl's characteristic number of surface singularities to arbitrary dimensions. We prove a basic monotonicity property of this volume under finite morphisms. We draw several consequences regarding the existence of non-invertible finite endomorphisms fixing an isolated singularity. Using a cone construction, we deduce that the anticanonical divisor of any smooth projective variety carrying a non-invertible polarized endomorphism is pseudoeffective. Our techniques build on Shokurov's b-divisors. We define the notion of nef Weil b-divisors, and of nef envelopes of b-divisors. We relate the latter notion to the pull-back of Weil divisors introduced by de Fernex and Hacon. Using the subadditivity theorem for multiplier ideals with respect to pairs recently obtained by Takagi, we carry over to the isolated singularity case the intersection theory of nef Weil b-divisors formerly developed by Boucksom, Favre and Jonsson in the smooth case.

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