Algebraic tori in the complement of quartic surfaces

22 Janeiro

Eduardo Alvez da Silva

Institut de Mathématiques d'Orsay

Contents

1. Recall from Eduardo's last talk that

   A *log Calabi-Yau* pair is a lc pair (X, D) consisting of a normal projective variety X and a reduced Weil divisor D such that $K_X + D \sim_{\mathbb{Z}} 0$.

   Now we have given a slightly different definition.

2. It was possible to classify Fano threefolds using these methods. (Recent.) Why? The anticanonical bundle is ample so there is a power that gives a section. . .

3. [Gross-Hacking-Keel, 2017]Log CY pair of index 1 and of corregularity 0 is log rational.

   Conjecture (Shokirov)   Every threefold rational log CY pair (X, B) and corregularity 0 is log rational.

4. Perhaps this has to do with a classification of toric varieties: [Brown, McKerman, Svaldi, Zong, 2018](X, B) log CY pair implies $c(X, B) \geqslant 0$. No I think it's this one:

   Idea   If $c(X, B) < 1$, then $X, \lfloor B \rfloor$ is toric.

5. Toric $\implies$ cluster type $\implies$ log rational. Counter examples for both of the reverse arrows are known.

6. [-,Figueroa, Moraga, 2024]$(\mathbb{P}^3, B)$ log CY pair, $i = 1$ corregularity 0. Assume Bb is non-normal. $(\mathbb{P}^3, B)$ is cluster type unless the nodal locus of B is centered in a plane.