

CALABI-YAU THREEFOLDS WITH TRIPLE POINTS AND TYPE III CONTRACTIONS - SUMMARY OF A PHD THESIS

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We study type III contractions of Calabi-Yau threefolds containing a ruled surface over a smooth curve. We construct quintic threefolds in \mathbb{P}^4 , complete intersection threefolds in \mathbb{P}^5 and sextic threefolds in weighted projective space $\mathbb{P}(1 : 1 : 1 : 1 : 2)$ admitting an ordinary triple point and containing a cone. We resolve the singularities of these to obtain Calabi-Yau threefolds admitting a type III contraction. We discuss the conditions necessary for the image threefold to be smoothable. In particular we show that for a contraction of a smooth ruled surface to a curve of genus > 1 a general geometric transition deforms to a conifold transition. We describe the change in Hodge numbers caused by this contraction and smoothing deformation. A generalization of a formula for calculating Hodge numbers of hypersurfaces in \mathbb{P}^4 and complete intersection threefolds in \mathbb{P}^5 with ordinary double and triple points is presented.

We construct new Calabi-Yau threefolds of Picard rank two arising from a family of some complete intersection threefolds containing a cone. We also discuss the possible number of ordinary triple points on some Calabi-Yau threefolds.