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Non-finitely generated Cox rings

Cox rings generalize the homogeneous coordinate ring of a toric variety. The main problem in the theory of Cox rings is to determine if they are finitely generated.

Goto, Nishida and Watanabe (1994) gave an infinite sequence of weighted projective planes blown up at a point, so that the resulting varieties do not have finitely generated Cox rings. Castravet and Tevelev (2013) used these varieties to prove that the Cox ring of the moduli space of rational stable n-pointed curves $\overline{M}_{0,n}$ is not finitely generated if $n \geq 134$.

We extend the family of weighted projective planes given by Goto, Nishida and Watanabe to more examples of non-finitely generated Cox rings. Then using the reduction method of Castavet and Tevelev, we prove that the Cox ring of $\overline{M}_{0,n}$ is not finitely generated if $n \geq 13$.

This is a joint work with Jose Gonzalez.