

Universally Counting Curves in Calabi-Yau Threefolds

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Enumerating curves in algebraic varieties traditionally involves choosing a compactification of the space of smooth embedded curves in the variety. There are many such compactifications, hence many different enumerative invariants. I will propose a “universal” (very tautological) enumerative invariant which takes values in a certain “Grothendieck group of 1-cycles”. It is often the case with such “universal” constructions that the resulting Grothendieck group is essentially uncomputable. But in this case, the cluster formalism of Ionel and Parker shows that, in the case of threefolds with nef anticanonical bundle, this Grothendieck group is freely generated by local curves. This reduces the MNOP conjecture (in the case of nef anticanonical bundle and primary insertions) to the case of local curves, where it is already known due to work of Bryan–Pandharipande and Okounkov–Pandharipande.

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