

Learning New Constructions of Toric Calabi-Yau Manifolds with Transformers

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Fine, regular, and star triangulations (FRSTs) of 4-dimensional reflexive polytopes generate toric varieties, within which Calabi-Yau threefolds can be embedded as hypersurfaces. We use transformers—deep learning models originally developed for language modeling—to generate FRSTs of polytopes of varying sizes. Our method shows promising scalability with polytope size and can be continuously improved through self-improvement and priming strategies, laying the groundwork for a self-updating online database of Calabi-Yau manifolds.

Presenter: YIP, Jacky Hoi Tung

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