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Triangulations of cosmological polytopes

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A cosmological polytope is defined for a given Feynman diagram, and its canonical form may be used to compute the contribution of the Feynman diagram to the wavefunction of certain cosmological models. Given a subdivision of a polytope, its canonical form is obtained as a sum of the canonical forms of the facets of the subdivision. The goal of this talk to report on specific types of triangulations of these polytopes, obtained via algebraic techniques. More precisely, we show that the toric ideal of every cosmological polytope a Gröbner basis with a squarefree initial ideal, yielding a regular unimodular triangulation of the polytope. In specific instances, including chains and cycles, we recover graphical characterizations of the facets of such triangulations that may be used to compute the desired canonical form. Choosing the term order wisely, for the chain, we find a triangulation that respects the graph symmetry and whose facets seem to be in bijection with certain graph tubings which used have been used by Arkani-Hamed, Baumann, Hillman, Joyce, Lee and Pimentel to use certain wavefunction coefficients.

Presenter: JUHNKE, Martina