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Chern Classes of Singular Varieties, Graph Hypersurfaces, and Feynman Integrals

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ABSTRACT

Numerical evidence indicates that the value of individual contributions of graphs to Feynman integrals are multiple zeta values. This fact can be interpreted as a statement concerning certain hypersurfaces of projective space determined by graphs. I will report on work aimed at understanding this phenomenon. Characteristic classes of singular varieties play an important role in this study, by quantifying the singularity of graph hypersurfaces, and by giving an algebro-geometric construction of invariants satisfying “Feynman rules”. This is joint work with Matilde Marcolli.