

Periods and generating functions in Algebraic Geometry

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In 1991 Candelas-de la Ossa-Green-Parkes predicted the number of rational curves of a fixed degree d in a generic quintic hypersurface using mirror symmetry. Since then there have been many efforts to give mathematical proofs for their result. The introduction of Gromov-Witten invariants n_d was one of these efforts. In this talk we recall the original construction of numbers n_d using the Picard-Fuchs equation of periods and then calculating the Yukawa coupling. Then we construct an ordinary differential equation in dimension five which is related to the generating function of n'_d 's. The idea of this work comes from the case of elliptic curves, where mirror symmetry takes a simple form, and the corresponding ordinary differential equation is given by Ramanujan relations between Eisenstein series.

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