

Stanford Algebraic Geometry — Seminar —

A ROLE OF LAPLACE TRANSFORM IN GROMOV-WITTEN THEORY

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Abstract

Laplace transformation changes a function defined on positive integers (or more generally, on positive real numbers) to a complex analytic function. Its nature is rather different from Fourier transformation, which is a straightforward duality. In this talk, I will start with presenting the Laplace transform of Hurwitz numbers and the celebrated cut-and-join equation of Goulden, Jackson, and Vakil. Of course the result is equivalent to the original, so mathematically nothing new is obtained. What is significant is the simple expression of the result of the Laplace transform. This simplicity suggests further applications of the idea, and also gives a mathematical interpretation of the “spectral curve” of the Eynard-Orantin theory and its geometric realization due to Bouchard, Klemm, Marino, and Pasquetti. These physical theories are obtained from a Virasoro constraint on matrix integrals, and hence imply a new and non-trivial Virasoro constraint for the Gromov-Witten invariants of toric Calabi-Yau 3-folds. This talk is based on my collaborations with Borot, Bouchard, Eynard, Safnuk, and Zhang.

Friday, November 6

4:00 p.m.

Room 383-N