Abstract

An Approach through Algebraic Combinatorics to Intersection Number Questions for the Moduli Space of Curves

The area of this talk is Algebraic Combinatorics. This is a retrospective view of research that I have done with George Andrews (Penn State), Ian Goulden (Waterloo), John Harer (Duke), Malcolm Perry (DAMTP, Cambridge), Alex Vainshtein (Haifa), Ravi Vakil (Stanford) and Terry Visentin (Winnipeg) over the last few years. The story is a connected one, from embedding of graphs in surfaces, a toy model for 2-dimensional quantum gravity from the 1990's, to a proof of Faber's Top Intersection Number Conjecture for all genera and at most five points, that pre-dated the current complete proof. I shall also touch briefly upon Hurwitz Numbers and ramified covers of the sphere, a very short proof of the λ_g-Conjecture of Getzler (proved by Pandharipande), and the use of material in these papers by Alex Kazarian in a very short proof of Witten's Conjecture – Kontsevich's Theorem, since these are also part of the same development.