

Kaufmann, R.; Manin, Yu.; Zagier, D.

Higher Weil-Petersson volumes of moduli spaces of stable n -pointed curves. (English)

Zbl 0890.14011

Commun. Math. Phys. 181, No. 3, 763-787 (1996).

The moduli spaces $\bar{M}_{g,n}$ of stable n -pointed complex curves of genus g carry natural rational cohomology classes $\omega_{g,n}(a)$ of degree $2a$, which were introduced by Mumford for $n = 0$ and subsequently by *E. Arbarello* and *M. Cornalba* [J. Algebr. Geom. 5, No. 4, 705-749 (1996; Zbl 0886.14007)] for all n . Integrals of products of these classes over $\bar{M}_{g,n}$ are called higher Weil-Petersson volumes; if only $\omega_{g,n}(1)$ is involved they reduce to classical WP volumes.

P. Zograf [in: Mapping class groups and moduli spaces of Riemann surfaces, Proc. Workshops Göttingen 1991, Seattle 1991, Contemp. Math. 150, 367-372 (1993; Zbl 0792.32016)] obtained recursive formulas for the classical WP volumes involving binomial coefficients. The authors generalise them in several ways: first they give both recursive formulas and closed formulas involving multinomial coefficients for higher WP volumes in genus 0, secondly they obtain a closed formula for higher WP volumes in arbitrary genus, where the multinomial coefficients get replaced by the less well known correlation numbers $\langle \tau_{d_1} \cdots \tau_{d_n} \rangle$.

Finally the authors describe the 1-dimensional cohomological field theories occurring in an article by *M. Kontsevich* and *Yu. Manin* with an appendix by *R. Kaufmann* [Invent. Math. 124, No. 1-3, 313-339 (1996; Zbl 0853.14021)] explicitly using the generating function they found for the higher WP volumes in genus 0. This last description has been generalised by *A. Kabanov* and *T. Kimura* ["Intersection numbers and rank one cohomological field theories in genus one", preprint 97-61, MPI Bonn] to the genus one case.

Reviewer: **Martin Pikaart (Essen)**

MSC:

14H10 Families, moduli of curves (algebraic)

14H20 Singularities of curves, local rings

Cited in **2** Reviews
Cited in **20** Documents

Keywords:

moduli spaces of stable pointed curves; Weil-Petersson volumes; 1-dimensional cohomological field theories; rational cohomology classes

Full Text: DOI arXiv

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