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Counting Feynman-like graphs: quasimodularity and Siegel-Veech weight. (English)

Zbl 1433.05155

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Summary: We prove the quasimodularity of generating functions for counting torus covers, with and without Siegel-Veech weight. Our proof is based on analyzing decompositions of flat surfaces into horizontal cylinders. The quasimodularity arises from representing the generating series as a contour integral of quasi-elliptic functions. This provides an alternative proof of the quasimodularity results of *S. Bloch* and *A. Okounkov* [Adv. Math. 149, No. 1, 1–60 (2000; Zbl 0978.17016)], *A. Eskin* and *A. Okounkov* [Invent. Math. 145, No. 1, 59–103 (2001; Zbl 1019.32014)] and *D. Chen* et al. [J. Am. Math. Soc. 31, No. 4, 1059–1163 (2018; Zbl 1404.32025)], and generalizes the results of *J. Böhm* et al. [J. Reine Angew. Math. 732, 211–246 (2017; Zbl 1390.14191)] for simple ramification covers.

MSC:

05C30 Enumeration in graph theory

05A15 Exact enumeration problems, generating functions

11F11 Holomorphic modular forms of integral weight

32G15 Moduli of Riemann surfaces, Teichmüller theory (complex-analytic aspects in several variables)

14H30 Coverings of curves, fundamental group

Cited in **9** Documents

Keywords:

quasimodular forms; Feynman graphs; Siegel-Veech constants; tropical covers; correspondence theorem

Full Text: [DOI](#) [arXiv](#)

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