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Identities among higher genus modular graph tensors. (English) Zbl 07485062 Commun. Number Theory Phys. 16, No. 1, 35-74 (2022)

Summary: Higher genus modular graph tensors map Feynman graphs to functions on the Torelli space of genus-\(h\) compact Riemann surfaces which transform as tensors under the modular group \(Sp(2h,\mathbb{Z})\), thereby generalizing a construction of Kawazumi. An infinite family of algebraic identities between one-loop and tree-level modular graph tensors are proven for arbitrary genus and arbitrary tensorial rank. We also derive a family of identities that apply to modular graph tensors of higher loop order.

MSC:

- 81T32 Matrix models and tensor models for quantum field theory
- 81T18 Feynman diagrams
- 81S40 Path integrals in quantum mechanics
- 30F10 Compact Riemann surfaces and uniformization
- 11F06 Structure of modular groups and generalizations; arithmetic groups
- 81T15 Perturbative methods of renormalization applied to problems in quantum field theory

Keywords:

higher-genus modular form; string scattering amplitude

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