Asymptotic expansions of Poincaré series

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In string theory $SL(2, \mathbb{Z})$ invariant functions, such as modular graph functions or coefficient functions of higher derivative corrections, are ubiquitous. Using a representation in terms of Poincaré series we can combine different methods for asymptotic expansions and obtain the complete perturbative and non-perturbative expansion. In the case of the higher derivative corrections, these terms have an interpretation in terms of perturbative string loop effects and pairs of instantons/anti-instantons.

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