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Using number theory to go from open- to closed string amplitudes at one-loop

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When tree-level scattering amplitudes in open string theory are expanded in α' , the coefficients are multiple zeta values (MZVs). These are mapped to a subset by the single-valued map from analytic number theory. As was proven recently, the corresponding MZVs in closed string amplitudes are just the single-valued image of the open string MZVs, therefore removing the need to calculate tree-level closed string amplitudes entirely. At one-loop, the expansion coefficients are functions of the modular parameters of the genus-one worldsheets associated to open or closed strings. Currently, several groups are working on finding an elliptic generalization of the single-valued projection to these objects which would make also the one-loop closed string calculation unnecessary. In particular, first promising results were obtained for four-point scattering in type-IIB. I will outline steps towards a generalization of these results which reveal more of the structure of the elliptic single-valued map.

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