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A new formulation of the loop-tree duality at higher loops

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Relating loop integrals to tree level objects goes back several decades to Feynman. In the past ten years the loop-tree duality theorem was introduced, which expresses l-loop integrals in terms of phase space integrals of sum of trees obtained from cutting l internal propagators of the loop graph. In addition, the uncut propagators gain a modified $i\delta$-prescription, named dual propagators.

In my talk I present a new formulation of the loop-tree duality theorem for higher loop diagrams valid both for massless and massive cases. In this new framework one can go beyond loop-graphs and calculate the integrand of loop-amplitudes as a weighted sum of tree graphs, which form a tree-like object. These objects can be computed efficiently via recurrence relations.

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