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# Massive Inflationary Amplitudes: Family-Tree Decomposition of Loop Integrands

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Cosmological correlators with massive loop exchanges appear frequently in cosmological collider model building as promising sources of oscillatory signals. However, their computations remain challenging. In this work, we apply the family-tree decomposition to correlators at loop level and derive rules to directly write down analytic answers for arbitrary massive loop integrands in terms of dressed family-tree functions. We also derive a complete set of differential equations satisfied by arbitrary loop integrands. Finally, we demonstrate how to perform loop momentum integrals and extract the complete nonlocal cosmological collider signals for a few examples, among which the results for 1-loop triangle graph and multiloop melon graph are new.

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