

In this article the authors deal with a challenging problem in the computation of Feynman integrals by developing techniques of *multiple* unitary-cut methods. Single unitary-cut methods are well-known computational techniques for the calculation of loop amplitudes in quantum field theory by applying analytic properties to the corresponding Feynman diagrams. Recent developments indicate that a variety of loop amplitudes can be expressed in terms of multiple polylogarithms. Mathematically, it is known that the multiple polylogarithms form a Hopf algebra. This suggests, as the authors state, an interesting interrelation among the computation of cut integrals, the mathematical operation of computing the discontinuity across a branch cut, and the coproduct of the integral.

The article contains a detailed description of these concepts and develops the multiple unitary-cut methods with examples of one-loop and two-loop integrals. Notation and convention are meticulously explained in the appendices so that the interested readers may follow the materials without relying on other references. Recent developments on the amplitude calculation in general suggest deep analytic properties of the Feynman integrals. It is expected that we would find a new understanding of monodromy through the study of unitary-cut methods for the loop calculations.