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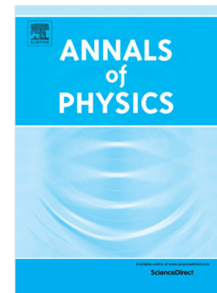
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Algebraic Cutting Equations

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Abstract

The cutting equations are diagrammatic identities that are used to prove perturbative unitarity in quantum field theory. In this paper, we derive algebraic, upgraded versions of them. Differently from the diagrammatic versions, the algebraic identities also holds for propagators with arbitrary, nonvanishing widths. In particular, the cut propagators do not need to vanish off shell. The new approach provides a framework to address unsolved problems of perturbative quantum field theory and a tool to investigate perturbative unitarity in higher-derivative theories that are relevant to the problem of quantum gravity, such as the Lee-Wick models and the fakeon models.

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