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Analytic Structure of the Gluon Propagator

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In a quantum field theory, the determination of the analytic structure of the propagators, i.e., the position of poles and branch cuts for complex momenta, can be obtained within the perturbative solution of the theory. The analytic structure has information on the properties of the associated quanta and, particularly, if they are or not confined particles. In Quantum Chromodynamics the computation of the complete propagators resorts in numerical calculations and, typically, only a limited range of momenta is obtained. Herein, we use Padé approximants to explore the analytic structure of the gluon propagator as computed in lattice QCD.

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