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Dyson-Schwinger equations for infrared Yang-Mills theories in different dimensions

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Abstract content

I will present a numerical solution of the coupled Dyson-Schwinger equations for the ghost and gluon propagators in Yang-Mills theory in Landau gauge. Aimed at investigating the infrared behaviour of the propagators, the equations are simplified by truncating the gluon loops, according to the ghost dominance hypothesis motivated by the Gribov-Zwanziger scenario. I have solved the equations with an iterative method, eliminating the ultraviolet divergence through a continuous regulator function depending on the cut off scale. The solutions, derived for different values of the Euclidean space dimension, present scaling (the infrared exponents are obtained) or decoupling behaviour, depending on whether the horizon condition is or is not implemented. Moreover, I will show that the renormalized coupling constant approaches a constant value in the IR, corresponding to an attractive fixed point.

Summary

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