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Induced YM theory with auxiliary bosons

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We study pure $SU(N)$ lattice gauge theory with a plaquette weight factor given by an inverse determinant which can be written as an integral over auxiliary bosonic fields (modifying a proposal of Budciz and Zirnbauer). We derive conditions for the existence of a continuum limit and its equivalence to Yang-Mills theory. Furthermore, we perturbatively compute the relation between the coupling constants of the ‘induced’ gauge action and the familiar Wilson gauge action using the background-field technique. The perturbative relation agrees well with numerical results for $N=2$ in three dimensions.

Primary authors: BRANDT, Bastian (University of Regensburg); LOHMAYER, Robert (University of Regensburg); WETTIG, Tilo (University of Regensburg)

Presenter: LOHMAYER, Robert (University of Regensburg)

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