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Energy-momentum tensor in the 2d O(3) non-linear sigma model on the lattice

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The long-term goal of this project is the non-perturbative renormalization of the energy-momentum tensor in the 2d O(3) nonlinear sigma model using different methods which have been developed for QCD applications. As a first step, we have identified all operators that mix with the energy-momentum tensor once a lattice discretization is employed, that is all which are compatible with power counting and with the symmetries of the theory. Since these operators are constrained by non-linear Ward identities arising from the non-linear realization of the O(3) symmetry, this is not entirely straightforward on the technical level. We will also present some preliminary results of numerical simulations with shifted boundary conditions and an optimized constraint action to minimize lattice artifacts. These simulations will be used to calculate the mixing coefficients with a strategy initially proposed by Giusti and Meyer.

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