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Domain decomposition and multilevel integration for fermions II

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The numerical computation of many hadronic correlation functions is exceedingly difficult due to the exponentially decreasing signal-to-noise ratio with the distance between source and sink. Multilevel integration methods, using independent updates of separate regions in space-time, are known to be able to solve such problems but have so far been available only for pure gauge theory.

We present first steps into the direction of making such integration schemes amenable to theories with fermions, by factorizing a given observable via an approximated domain decomposition of the quark propagator. This allows for multilevel integration of the (large) factorized contribution to the observable, while its (small) correction can be computed in the standard way.

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