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Using NSPT for the Removal of Hypercubic Lattice Artifacts

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The quantification and subtraction of hypercubic lattice artifacts is essential for the calculation of non-perturbative renormalization constants. It has been shown that for the RI'-MOM scheme a large part of these artifacts can be calculated using Lattice Perturbation Theory (LPT), but these calculations are typically restricted to 1-loop order and to bilinear quark operators with one derivative at most.

With Numerical Stochastic Perturbation Theory (NSPT) one may overcome this limitation and calculate hypercubic corrections beyond 1-loop order, for any operator and action. In this study, we explore the practicability of this approach and consider, as a first test, the case of Wilson fermion bilinear operators in a quenched theory.

Author: Mr SIMETH, Jakob (University of Regensburg)

Co-authors: Dr STERNBECK, Andre (University of Regensburg); Dr SCHILLER, Arwed (Leipzig University); Dr PERLT, Holger (Leipzig university); Dr GOECKELER, Meinulf (University of Regensburg)

Presenter: Mr SIMETH, Jakob (University of Regensburg)

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