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## Hutch++ and XTrace to improve stochastic trace estimation

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We present the analysis of two recently proposed noise reduction techniques, *Hutch++*<sup>1</sup> and *XTrace*<sup>2</sup>, both based on inexact deflation. These methods were proven to have a better asymptotic convergence to the solution than the classical *Hutchinson stochastic method*. We applied these methods to the computation of the trace of the inverse of the Dirac operator with  $O(a)$  improved Wilson fermions on the QCD ensemble generated by the RC\* collaboration with  $m_\pi \approx 400$  MeV and  $V = 64 \times 32^3$ . Unfortunately, we see no noise reduction with a moderate number of sources, and we attempt an explanation of why this is the case. This study was part of the effort to evaluate Isospin Breaking effects using the RM123 with C\* boundary conditions in an unquenched set-up.

References:

1. arXiv:2010.09649
2. arXiv:2301.07825

### Topical area

Algorithms and Artificial Intelligence

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