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Editorial Board

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Dear Editorial Board,

This paper is a submission for the ‘Best of M&C 2013’ special issue of Nuclear Engineering and Design. It presents the development of an analytical theory for the domain-decomposed behavior of the Neumann-Ulam Monte Carlo method for linear systems based on spectral analysis and previous work in domain decomposed Monte Carlo algorithms for reactor physics. In preparation for potentially fault-prone exascale computing platforms, there is a growing interest in developing numerical algorithms that are resilient to faults. As part of our own ongoing research on resilient solvers for exascale machines, this work provides a theoretical basis for performance models that can be used to improve parallel algorithms for the Neumann-Ulam method.

To demonstrate the validity of our analytic relationships, we perform several numerical experiments that show excellent agreement with the derived results. Numerical experiments in the paper were conducted using a parallel C++ code written by the authors that implements the Neumann-Ulam Monte Carlo method. The data used to generate the figures in the document was created directly from code output.

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Thank you for considering this submission.

Regards,

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