1112-62-504 **Somak Dutta***, somakd@iastate.edu, and **Debashis Mondal**. *Variogram calculations for random fields on regular lattices using quadrature methods.*

We discuss a numerical algorithm for calculating a large class of analytically intractable theoretical variogram functions that arise in studies of random fields on regular lattices. Examples of these random fields include conditional and intrinsic autoregressions, fractional Laplacian differenced random fields, and regular block averages of continuum random fields. Typically, the variogram functions for these random fields appear in the form of multi-dimensional integrals with singularities at the origin, and, the algorithm laid out to evaluate these integrals invoke certain quadrature rules and regression formulas based on the asymptotic expansions of these integrals. This is so that singularities at the origin can be accounted for in a straightforward manner. This numerical algorithm opens new avenues to advancing geostatistical data analysis and solving krigging and estimation problems for various lattice-based random fields. The usefulness of this numerical method is illustrated by fitting certain theoretical variogram functions to ocean color and the Waker lake data. (Received August 10, 2015)