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Techniques for evaluating parallel random number generator SHU-JU TU, The University of Texas MD Anderson Cancer Center, EPHRAIM FISCHBACH, Purdue University — We have developed two statistical schemes to quantify random number generators used in parallel computation. The first method is based on the GRIP (Geometric Random Inner Products) formalism that applies geometric probability theory to evaluate the average scalar products for the random vectors distributed in geometric objects. We explicitly used the GRIP tests to compare some parallel random number generators. A visualization technique to evaluate the quality of the parallel random number generators was also developed. The method is based on the quantum noise simulation in cone beam computed tomography imaging. The Feldkamp algorithm was applied to reconstruct the phantom images containing quantum noise simulated from parallel random number generators. A mathematical phantom was analytically sampled and the results indicated that regular geometrical patterns can be observed in the reconstructed images produced from correlated random number sequences.

Shu-Ju Tu
The University of Texas MD Anderson Cancer Center

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