1096-86-1116 **Peiliang Xu*** (pxu@rcep.dpri.kyoto-u.ac.jp), Disaster Prevention Research Institute, Kyoto University, Gokasho, Uji, Kyoto 611-0011, Japan. *Experimental evaluation of lattice reduction methods for discrete tomography.*

Reduction can be important to aid quickly estimating integer unknowns from noisy data for discrete tomography. We present an improved LLL algorithm with fixed complexity by extending a parallel reduction method for positive definite quadratic forms to lattice vectors. We propose the minimum angle of a reduced basis as an alternative quality measure of orthogonality, which is intuitively more appealing to measure the extent of orthogonality of a reduced basis. We conduct a large scale of experiments to evaluate five reduction methods, based on six quality measures of reduction. We investigate the mean running behaviors of the five rduction methods. The improved LLL algorithm with fixed complexity is shown to perform better than all the other reduction methods under study. The reduced Gram-Schmidt coefficients from experiments clearly show that they are not uniformly distributed but depend on the reduction algorithms used. They also clearly show that our improved LLL algorithm tends to produce small reduced Gram-Schmidt coefficients near zero with a larger probability and large reduced Gram-Schmidt coefficients near both ends of 0.5 and -0.5 with a smaller probability, implying that the quality of reduction may depend on the distribution of reduced Gram-Schmidt coefficients. (Received September 13, 2013)