

Latin hypercube sampling for dependent inputs

Abhijit Mandal, Department of Mathematical Sciences, UTEP

email amandal@utep.edu

**Abstract:** We present a new approach to Latin hypercube sampling from statistically dependent random variables. The proposed method can be used to obtain samples from the input space of a computer forward model in estimating the expectation of a given function of the corresponding output variables. The advantage of the proposed method over the existing methods is that it preserves the exact form of the joint distribution of the input variables. The asymptotic distribution of the new estimator is derived. Asymptotically, the variance of the estimator using the proposed method is smaller than that obtained using simple random sampling, with the degree of variance reduction depending on the degree of additivity in the function being integrated. This technique is applied to a practical example related to the performance of the river flood inundation model.