

# Construction of Orthogonal-MaxPro Latin Hypercube Designs

Qian Xiao

Department of Statistics, University of Georgia, USA

## Abstract

Orthogonal Latin hypercube designs (LHDs) and maximum projection (MaxPro) LHDs are widely used in computer experiments. They are efficient for estimating the trend part and the Gaussian process part of the universal Kriging (i.e. the Gaussian process) model, respectively, especially when only some of the factors are active. Yet, the orthogonality and the MaxPro criteria often do not agree with each other. In this work, we propose a new class of optimal designs, called orthogonal-MaxPro LHDs, optimizing a well-defined multi-objective criterion combining the correlation and the MaxPro metrics. An efficient parallel algorithm via level permutations and expansions is developed, whose efficiency is guaranteed by theories. Numerical results are presented to show that the construction is fast and the obtained designs are attractive, especially for large computer experiments.