

GENERAL SLICED LATIN HYPERCUBE DESIGNS

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Abstract: We propose a method for constructing general sliced Latin hypercube design, intended for computer experiments. A general sliced Latin hypercube design has multiple layers, at each of which there are multiple Latin hypercube designs that can be sliced into smaller Latin hypercube designs at the next layer. The proposed method is easy to implement, capable of accommodating any number of factors and flexible in run size. Such designs include ordinary Latin hypercube design and sliced Latin hypercube design as special cases. A special case of general sliced Latin hypercube design with two layers, called doubly sliced Latin hypercube design, is studied in detail, including its sampling properties. The more flexible structure of doubly sliced Latin hypercube design than sliced Latin hypercube design allows more flexible batch size for both collective evaluation of different computer models and batch sequential evaluation of a single computer model. Numerical examples are provided to show the advantage of the former over the latter.

Key words and phrases: computer experiment, design of experiments, space-filling design, ensembles of computer models.