

Uniform Design and its Recent Development

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Abstract:

The uniform design was motivated by three big projects in system engineering in 1978. Since then the uniform design becomes one of space-filling designs for computer experiments as well as physical experiments with model unknown.

Computer experiments have been widely used in various fields of industry, system engineering, and others because many physical processes are difficult or even impossible to study by conventional experimental methods. Design and modeling of computer experiments have become a hot topic since late Seventies of the Twentieth Century. Almost in the same time two different approaches are proposed for design of computer experiments: Latin hypercube sampling (LHS) and uniform design (UD). The former is a stochastic approach and the latter proposed in 1978 is a deterministic one. In this talk I will review the developments in the past 25 years of these two approaches and discuss their advantages and shortcomings.

Various discrepancies as measures of uniformity of experimental points on the domain have played important role in construction of uniform designs and data modeling. In the past decade many authors have found many interesting applications of discrepancies in fractional factorial designs and supersaturated designs. The talk will review the development in this direction and address related discussions.

In the past decades the uniform design has been widely applied in industry and sciences. This talk also reviews its applications.