

Recent advances in design of computer experiments

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Computer models have become a routine practice for understanding complicated physical phenomena. Specially-designed experiment is required to run these computer experiments much more efficiently. Space-filling designs, such as Uniform Design or Latin hypercube (LHC) designs have recently found wide applications in running computer experiments. However, the original construction of LHDs by mating factors randomly is susceptible to having potential correlations among input factors. It is thus desirable to have an orthogonal Latin hypercube design. A series of orthogonal LHC have been constructed to be suitably applied to various types of computer models. This includes *regular (first-order and second-order) orthogonal LHC*, *nested orthogonal LHC*, *sliced orthogonal LHC*, *uniform sliced LHC*, as well as *orthogonal LHC for computer models with both qualitative and quantitative variables*. Recent developments on these newly constructed designs will be reviewed and discussed, from both theoretical and application perspectives. This talk is based upon some initial results of my long time collaboration efforts with a computer experiment research team at Nankai University (Tianjing, China), led by Professors Minqian Liu and Jianfeng Yang. Their efforts must be acknowledged.