THE UNIVERSITY OF GEORGIA
DEPARTMENT OF STATISTICS

Colloquium Series

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Model-discriminating designs and a class of new particle swarm optimization algorithms

Optimal designs have been widely used in Design of Experiments (DOE). If we are unsure about the form of the true model, on which the optimality criteria are based, a good design should have the capability to distinguish between two competing models. We first discuss several model discriminating criteria, whose statistical properties are explored. We then propose a class of new Particle Swarm Optimization (PSO) algorithms for constructing optimal designs. In recent years, PSO algorithms have been proposed in design construction problems, but their were used mostly for continuous-type of problems. In this talk we develop a general class of PSO algorithms, targeting discrete-type of design problems. In particular, we use the proposed algorithm to construct a class of optimal model-discriminating designs. It is shown that the algorithms work both efficiently and effectively. The algorithms also compare favorably with the coordinate-exchange algorithm - one of the most commonly used algorithms. We focus on a set of linear models with main effects and some two-factor interactions. Some new results of optimal designs are obtained.