Mathematics > Statistics Theory

An Approximate Approach to E-optimal Designs for Weighted Polynomial Regression by Using Tchebycheff Systems and Orthogonal Polynomials

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In statistics, experimental designs are methods for making efficient experiments. E-optimal designs are the multisets of experimental conditions which minimize the maximum axis of the confidence ellipsoid of estimators. The aim of this thesis is to propose a new algorithm for constructing E-optimal designs approximately for weighted polynomial regression with a nonnegative weight function.

First, an algorithm to calculate E-optimal designs for weighted polynomial regression of particular weight functions is discussed. Next a new algorithm for constructing E-optimal designs approximately is proposed. Notions of the Tchebycheff systems and orthogonal polynomials are used in the proposed algorithm. Finally in this thesis, the results of numerical examples are shown in order to verify the accuracy of the E-optimal designs computed by the proposed algorithm.

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