D-OPTIMAL DESIGNS FOR WEIGHTED POLYNOMIAL REGRESSION—A FUNCTIONAL APPROACH

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Abstract. This paper is concerned with the problem of computing approximate D-optimal design for polynomial regression with analytic weight function on a interval $[m_0 - a, m_0 + a]$. It is shown that the structure of the optimal design depends on a and weight function. Moreover, the optimal support points and weights are analytic functions of a at $a = 0$. We make use of a Taylor expansion to provide a recursive procedure for calculating the D-optimal designs.

Key words and phrases: Approximate D-optimal design, Chebyshev system, D-efficiency, D-Equivalence Theorem, implicit function theorem, recursive algorithm, Taylor expansion, weighted polynomial regression.