A Dual response Approach to the Multivariate Robust Parameter Design Problem

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ABSTRACT

An extension to the Dual Response approach to Robust Parameter Design for the case of multiple responses is proposed. The methodology enables for the unbiased estimation of the process covariance matrix and for the vector of expected values using parameter estimates from a multivariate regression fit. There are no restrictions on the types of experimental designs that can be used, apart from their ability to fit the parameter estimates. Conditions for zeroing-out the variance contribution of the noise factors on the responses are also given for an unconstrained problem. For the more practical constrained case a discussion of the possible scalar optimization criteria of the covariance matrix is also given together with two illustrative examples taken from the literature.