Computation and Visualization of Confidence Regions for Optimal Factor Levels in Constrained Response Surface Problems

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Abstract

An improved approach for computing the confidence regions for the optimal factor settings obtained for optimizing a general response surface model is presented. The approach has a better computational efficiency and improved accuracy compared to existing methodology. A three-factor mixture experiment was used for the performance comparison. The coverage rate properties of the resulting confidence regions were assessed through an extensive simulation study. Issues in the visualization of high dimensional confidence region are discussed and illustrated using a five-factor experimental design.