

Integrating steepest ascent for the taguchi experiment: A simulation study

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Abstrak

Many previous researches conveyed the superiority of Steepest Ascent (SA) method to find the optimal area in Response Surface Methodology (RSM) by shifting the experiment factor level. By using this method, Design of Experiment (DoE) is enabled to shift the factor level gradually in the right track, so that the global optimum can be reached. However, the response variable that is commonly optimized by using RSM cannot fulfill the classical statistics assumption of surface regression model. Taguchi's orthogonal array, as alternative of RSM, gives loose statistics assumptions in performing the analysis. However, Taguchi's orthogonal array has not yet been supported to shift the factor level to an optimum direction. Adopting the procedures of RSM in finding the optimal level combination using SA, integrating SA method in the Taguchi experiment is proposed in this paper. This procedure is applied into a simulated response surface. Then, the performance of this procedure is evaluated based on its direction to reach the optimum solution. The simulation data representing the real case is generated for two factors. Then, the proposed procedure is applied. The result of this simulation study shows that the integrated SA method in the Taguchi experiment successfully found the factor level combination that yields optimum response even though it is not as close as possible as the RSM results.