

1077-62-269

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Solving Tolerance Optimization Problems for Complex Manufacturing Systems.

Within an industrial environment, the optimal process settings often translate directly to improvements in product quality or a reduction in the number of defects. In the traditional design of the tolerance optimization problem, the ideal settings are sought based upon a set of fixed costs and specific values for the model parameters, such as the mean and variance. The production costs, however, may be highly variable over a manufacturing period and the parameter measures may shift or drift as time passes. Hence, the robustness and credibility of the results that are generated may be questionable without repeatedly solving the optimization problem. In order to gain greater predictability in tolerance design, this research examines the relationship between the tolerance region and changing costs or parameter shifts. A nonlinear optimization scheme with an economic objective is utilized to demonstrate a potential research methodology. (Received August 17, 2011)