RELIABILITY-BASED DESIGN OPTIMIZATION OF A SUPERSONIC NOZZLE

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The practical application of reliability-based design optimization (RBDO) requires both accurate models and efficient reliability analysis and optimization methods. However, these methods become prohibitively expensive for complex multiphysics engineering applications. In addition, the robust implementation of such multiphysics packages is nontrivial. As a result, we have developed a a new multifidelity RBDO approach and a multiphysics simulation suite for supersonic nozzles to demonstrate the application of RBDO to a complex coupled aerospace design problem. Our results illustrate the use of a reliability-based design workflow, the challenges of developing a robust multiphysics model, and show the benefits of using design under uncertainty methods for the design of a reliable supersonic nozzle.

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