Investigators:
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Funding Source:
University of Missouri Research Board

Project Description:
The objective of this research is to establish a collaborative optimization framework and computationally practical tools that provide accurate and efficient solutions to problems of reliability-based design for complex engineering systems, such as automobiles, aircraft, or consumer products, where multiple interacting disciplines and the mixture of random and interval variables are involved. The research is motivated by the industrial need: managing risk in multidisciplinary systems design (such as aerospace vehicle design) with high levels of safety and reliability, and high efficiency and accuracy. The research objective is accomplished at two complementary levels – the analysis level and design level. At the analysis level, efficient reliability analysis methods and algorithms are developed under multidisciplinary environment and the mixture of random and interval variables. At the design level, mathematical formulations of reliability-based design model that can be solved efficiently are sought by means of the inverse reliability strategy. With the ability of facilitating distributed computations, the overall reliability-based multidisciplinary systems design is performed through a sequential single-loop procedure with the minimum computational effort.

Publications: