Jun-Ming Hu, Hong-Zhong Huang and Yan-Feng Li, 2019, Reliability growth planning based on information gap decision theory, *Mechanical Systems and Signal Processing,* vol. 133.

Highlights

- A novel robust reliability growth planning decision method is proposed.
- The robustness is quantified by the maximum amount of uncertainty.
- A case study is applied to demonstrate the proposed approach.
- This method is useful when sparse information is available.

Abstract Resources allocation is one of the key issues in the planning of reliability growth testing. Sparse information and testing prototypes are available for program managers in the research and development phases, especially at the early development stage. However, program managers or engineers are often needed to make decisions with incomplete information or even severe uncertainty. Optimizing strategy has been used to allocate resources for reliability growth testing, which sets up optimization models and maximizes the reliability within the resource constraints. A novel robust decision method for the planning of reliability growth testing based on the information gap decision theory is proposed, which aims to satisfy the system reliability requirements and keeps the decision insensitive to the initial estimation of relevant uncertain parameters. The information gap robustness function provides an alternative approach to address the planning of reliability growth testing. The case study demonstrates the applicability of the proposed method in practical problems. The main advantage of this method is that only a few information of the uncertain parameters is required. The results indicate that this method is useful for program managers and reliability practitioners who are engaged in reliability growth planning.

Keywords Reliability growth planning, Information gap decision theory, Robustness function, Nonhomogeneous Poisson Process.

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