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Dr. Alexander J. Smits

Editor-in-chief, AIAA Journal

Department of Mechanical and Aerospace Engineering

Princeton University

Princeton, NJ 08544

Dear Dr. Smits,

Please find enclosed a manuscript that we would like to submit for publication in the AIAA Journal, titled “Optimal Aircraft Design Decisions under Uncertainty via Robust Signomial Programming”. It proposes a new approach for engineering design under parametric uncertainty via robust signomial programming. Within our framework, we pose stochastic design problems as deterministic problems by considering the worst-case robust counterpart of each design constraint. This allows us to design under uncertainty with probabilistic guarantees of design feasibility.

To the best of our knowledge, this is the first attempt at using principles of robust optimization in the solution of non-linear programs, and especially in aerospace design. Using an unmanned aircraft design example, we demonstrate that our optimization method is less conservative than legacy design methods such as margins and multi-mission design, while better protecting against uncertain outcomes. We believe our method and results make valuable contributions to a number of research fields, including optimization methods, aerospace conceptual design, and design under uncertainty. The manuscript was also submitted with minor edits for publication in the 2019 AIAA Aviation conference proceedings, and it will be presented on June 19th. Note that, by the recommendation of ScholarOne Support, only the PDF of the manuscript was submitted due to LaTeX compilation issues. The source code will be sent to the editorial office by email.

The authors of the paper are myself and Ali Saab. I am a PhD candidate in the Aerospace Computational Design Lab of MIT’s Department of Aeronautics and Astronautics. Ali has recently received his S.M. from the same lab and department, and has commenced work outside of academia as a computational engineer.

Thank you for your consideration, and we look forward to your response.

Best regards,

Berk Öztürk

Ali Saab