

Public Abstract

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Title:**Objective Bayesian Inference for Stress-Strength Models and Bayesian ANOVA**

The first part of this dissertation studies the reliability of stress-strength models. This problem has applications in engineering, clinical trials, quality control, and many other areas. A Bayesian method is proposed for this problem, and numerical studies using both simulated and real data demonstrate that the proposed method has advantages over the current methods. Thus, this method can benefit researchers in the related areas.

The second part considers the model selection problem, which arises from the practical need of using data to decide the plausibility of different models in scientific and sociological research. I propose a Bayesian approach for this problem and show, both empirically and theoretically, that this approach performs better than the current ones. The method is applicable to a large number of fields since the problem is prevalent in many areas including agriculture, industry, medicines, psychology, biology, and business management.