

PREFACE: RECENT ADVANCES IN GLOBAL SENSITIVITY ANALYSIS

As the models we rely on to inform our decisions get increasingly complex and opaque, understanding how model input parameters influence the model output becomes of paramount importance. This is where global sensitivity analysis (GSA) plays a crucial role. Global sensitivity analysis is a systematic approach that quantifies how the uncertainty in the output of a mathematical model can be allocated to different sources of uncertainty in its input parameters, providing insight into which parameters most significantly impact results. Identifying critical model parameters and how these parameters interact with each other and affect results is crucial for deeper understanding of a model. By exploring the entire input space, GSA transcends the limitations of local sensitivity analysis, allowing for a more comprehensive understanding of a model's behavior. GSA has a wide range of applications across various fields from natural sciences to engineering, and social sciences to mathematical sciences.

Advancements in computing power, the popularity of GSA in interdisciplinary applications, the use of GSA in machine learning and AI, and educational efforts for disseminating GSA techniques have played a role in the growing pool of researchers and practitioners in the field, and a significant increase in research related to GSA. This special issue on GSA is a timely contribution to this growing field of research. Articles in the special issue cover new applications, methods, and algorithms. I hope the readers of IJUQ will enjoy this special issue.

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