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RECENT DEVELOPMENTS IN COMPUTATIONAL METHODS FOR STRUCTURAL OPTIMISATION

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ABSTRACT

Research in the field of structural optimisation has flourished in the past few decades offering an engineering design tool. Perhaps the most generalised and versatile structural optimisation is topology optimisation which is commonly formulated as a material distribution problem. This is discrete and non-convex therefore the optimality of the solutions cannot be guaranteed. The composite laminate design problems are inherently discrete often with a number of discrete manufacturing and design constraints. The loading conditions of an engineering design are often complex and the reliability of the kinematics conditions for which a structure is designed is critical to the safety of the design.

The above just lists a few of the challenges engineers face as structural optimisation is increasingly applied to practical designs. Engineering design problems are typically ill-defined and discrete. Therefore the mathematical programming and optimisation methods present difficulties as they have been developed for optimisation of a well-defined continuous problem.

This mini-symposium aims to provide a forum for discussion of recent developments in computational methods in structural optimisation for engineering design problems. The areas of interests include but are not limited to:

- Fast analysis and reanalysis methods suitable for optimisation
- Discrete optimisation methods
- Multi-disciplinary and multi-physics optimisation methods
- Multi-level and multi-fidelity optimisation models
- Methods for reliability optimisation
- Optimisation methods for non-linear structures
- Investigation of and methods for eliminating numerical instabilities
- Optimisation for manufacturing and life-cycle costs