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SHAPE AND TOPOLOGY OPTIMIZATION: THEORETICAL ADVANCES AND NUMERICAL METHODS

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ABSTRACT

Spurred by the dramatic increase in the cost of raw materials and the pressing necessity of realizing energy savings, shape and topology optimization has been a thriving field of research for applied mathematicians, physicists and engineers over the last decades, leading to the development of manifold numerical algorithms.

The main issue at stake — that of finding the optimal domain with respect to a given criterion about its physical performance — naturally arises in a whole gamut of situations: beyond its historical applications in structure mechanics and exterior aerodynamics, optimal design has made remarkable forays in acoustics, electromagnetism, chemistry, to name just a few recent examples. The algorithmic developments of shape and topology optimization have been greatly influenced by the advent of high performance computing and machine learning, and, from the mechanical viewpoint, by the rich perspectives heralded by additive manufacturing techniques.

This mini-symposium aims to gather experts in shape and topology optimization and to discuss recent advances in this discipline, ranging from the theoretical introduction and analysis of new, promising methods, to applications in the context of concrete, challenging or emerging physical situations.

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