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Invited Session

Shape and Topology Optimization and Applications

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The main aim of the Session is to gather together researchers interested in the development and application of contemporary shape optimization. The shape optimization is understood here in the usual and generalized meaning, the latter referring both to the relaxed formulations by admitting composite regions in the final design as well as to the free material design method, where the distribution of material properties is looked for. Recent achievements concerning the regularity in shape optimization of eigenvalues, the explicit solutions for model problems, the asymptotic and perturbation techniques of predicting sensitivities, the topological derivatives, the level sets techniques, new filtering methods, the neural networks as well as new efficient interior point optimization codes have changed the subject substantially thus making it possible to solve old, still unsolved inverse problems and formulate new tasks of vivid theoretical and engineering importance, among which a rational using of the functionally graded materials is worth emphasizing. The advanced and modern mathematical analysis is combined with scientific computations and mechanical engineering, in our contribution to the field of shape and topology optimization.