

Advances in shape optimization: algorithms, simulations and applications

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Several problems in the field of life science and engineering are characterized by the presence of moving and deformable domains. We are particularly interested in optimization problems in which the cost functional depends on the solution of a Partial Differential Equation set in a domain whose shape is allowed to change. In this minisymposium, we propose to explore some recent advances in shape optimization methods from the point of view of both the development of new algorithms and the application to modern challenging problems in engineering and life sciences.

A non-exhaustive list of possible topics includes optimization methods based on shape and topological gradients, second-order methods, level-set and phase field approaches, density methods, robust shape optimization, shape optimization under uncertainties, exact representation of the geometry, mesh adaptation, parameterized geometry, reduced order models, manufacturing constraints, additive manufacturing, optimal design of structures, drag minimization, biological membranes, inverse identification problems.

The minisymposium is expected to be addressed to an audience of both applied mathematicians and engineers. We expect to have some invited talks by recognized experts in the field and leave open the possibility of high-quality third party contributions.