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Analytical and numerical methods in shape optimization *

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Shape optimization is indispensable for designing and constructing industrial components. Many problems that arise in application, particularly in structural mechanics and in the optimal control of distributed parameter systems, can be formulated as the minimization of functionals defined over a class of admissible domains. The present talk aims at surveying on shape optimization. Especially, the following items will be addressed:

- analysis of shape optimization problems
- the discretization of shapes
- first and second order shape optimization methods
- existence and convergence of approximate shapes
- efficient numerical techniques to compute the state equation

Key words: shape optimization, shape calculus, existence and convergence of approximate solutions, optimality conditions

Mathematics subject classifications (1991): 49Q10, 49K20, 49M15, 65K10

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