

# MAP562 Optimal design of structures

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### Exercise 1

Take the cantilever script as basic program from the practical exercises TP 6. Next, you take “your” configuration from Homework 4 (parametric optimization). Consequently, we consider the same geometry, material parameters and boundary conditions as in Homework but now subject to geometric optimization. To this end, you need to add some holes (as in the cantilever example). As PDE we keep going with elasticity. As cost functional we consider again compliance minimization.

1. Design a program that computes the above problem.
2. In the second homework task, we only change the geometry and boundary conditions as displayed in Figure 1 and keep the PDE and the cost functional. Test by yourself where, and how many, holes are required in the initial configuration in order to achieve sufficient decrease in the cost functional.

Hint: Be careful with the top boundary where the forces are acting. You might need to add one mesh layer on the top boundary that is non-optimizable.

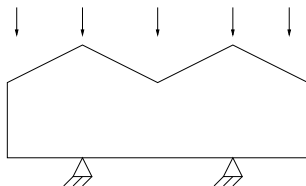


Figure 1: Homework 2: Geometry, boundaries, and surface forces.

**Remark:**

Please upload your solutions as separate files on

<http://www.cmap.polytechnique.fr/~MAP562/>