Shape optimization for composite materials and scaffolds

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This talk combines shape optimization and homogenization techniques by looking for the optimal design of the microstructure in composite materials and of scaffolds. The development of materials with specific properties is of huge practical interest, for example, for medical applications or for the development of light weight structures in aeronautics. In particular, the optimal design of microstructures leads to fundamental questions for porous media: what is the sensitivity of homogenized coeffcients with respect to the shape of the microstructure? We compute Hadamard's shape gradient for the problem of realizing a prescribed effective tensor and demonstrate the applicability and feasibility of our approach by numerical experiments.

References:

[1] https://edoc.unibas.ch/77485/2/19m1274638.pdf

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