Optimum Experimental Design by Shape Optimization of Specimens in Linear Elasticity

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Optimum Experimental Design (OED) is an established technique in various scientific disciplines in order to enhance the accurary of parameter identification by experiments. In this talk we consider the identification of the material parameters in linear elasticity, i.e., Young's modulus and the Poisson ratio. A novelty of our approach is that we use the geometry of the specimens in order to optimize the precision of the parameter estimation. We formulate an associated shape optimization problem and derive an appropriate volume representation of the shape derivative using a material derivative free approach. Numerical experiments are included.

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