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WORST CASE OPTIMAL DESIGN USING SMALL AMPLITUDE HOMOGENIZATION

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Abstract: The Small Amplitude Homogenization idea is used to solve minimization optimal design problems in the worst possible case, when there is uncertainty in some of the information needed to formulate the state equation of the problem. To select the worst possible case, a first order approximation of the objective function in terms of the quantity known with uncertainty is maximized over the set of admissible perturbations. Considering perturbations of bounded norm, the worst posible case becomes explicit and the aforementioned first order approximation is minimized by a gradient method. Numerical examples are provided, first for heat diffusion when the internal heat source is known with uncertainty, and secondly, for shear walls in linear elasticity when the boundary force is perturbed.