SHAPE OPTIMIZATION IN CONTACT PROBLEMS WITH COULOMB FRICTION

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Abstract

Let us deal with the problem of optimal shape design in contact problems with Coulomb friction. We are able to describe this problem as a Mathematical Program with Equilibrium Constraint. This mathematical program can be treated by the implicit programming approach: the equilibrium constraint locally defines a implicit function and allows to convert the problem into a mathematical program with a nonsmooth objective. Using the "nondifferentiable" calculus of Clarke, we are able to use a solution method based on the bundle technique of nonsmooth optimization. Then we provide the sensitivity analysis of the problem, required by the bundle-trust algorithm. Finally we apply our approach to the optimal shape design in contact problems with Coulomb friction and perform some numerical experiments.

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