

Nonsmooth Problems with Applications in Mechanics
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**Phase Field Approach to Topology Optimization
of Elasto-Plastic Contact Problems**

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Abstract: Topology optimization problems constrained by variational inequalities governing the elasto-plastic frictional contact phenomenon are considered. The distribution of material in a region is optimized with respect to a given target functional taking into account normal contact stress. These optimization problems are non-smooth and non-convex. We prove that this topology optimization problem formulated as phase field problem admits a solution. First-order necessary optimality conditions are obtained by considering a regularized problem and passing to the limit. The relation to sharp interface optimal solutions is discussed.