

## Topological Optimization for Contact Problems

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The new approach is proposed for the topological optimization of contact problems. Contact problems are described in the framework of linear elasticity with unilateral constraints, so the model takes on the form of variational inequality. We derive the first order exterior asymptotic approximation of solutions with respect to small parameter. The small parameter measures the size of a small hole or inclusion in the geometrical domain. The approach is based on parametrization of energy functionals using the regular perturbations. By means of this method the exterior expansion of solutions is obtained, with the first term given by the solution of an auxiliary variational inequality. Such an expansion enables us to derive the form of topological derivatives of shape functionals including, among others, the compliance. Numerical results are provided which confirm the theoretical error estimates derived for model problems.

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