TOPOLOGY OPTIMIZATION OF SYSTEMS
GOVERNED BY VARIATIONAL INEQUALITIES

ANDRZEJ MYŚLIŃSKI
Systems Research Institute
Polish Academy of Sciences, Warsaw, Poland
e-mail: myslinsk@ibspan.waw.pl

Abstract
This paper deals with the formulation of the necessary optimality condition for a topology optimization problem of an elastic body in unilateral contact with a rigid foundation. In the contact problem of Tresca, a given friction is governed by an elliptic variational inequality of the second order. The optimization problem consists in finding such topology of the domain occupied by the body that the normal contact stress along the contact boundary of the body is minimized. The topological derivative of the cost functional is calculated and a necessary optimality condition is formulated. The calculated topological derivative is also used in the numerical algorithm to find a descent direction by inserting voids in the domain occupied by the body. Numerical examples are provided.

Keywords: variational inequality, topology optimization.

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References


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