

THREE WEAK FORMULATIONS FOR AN OBSTACLE MODEL AND THEIR RELATIONSHIP*

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Dedicated to Dr. Dan Tiba on the occasion of his 70th anniversary

Abstract

We consider an obstacle model mathematically described by means of a boundary value problem governed by PDE. Three possible variational formulations are highlighted. The first one is a variational inequality of the first kind and the other two are mixed variational formulations with Lagrange multipliers in dual spaces. After we discuss the solvability of the three variational formulations under consideration we focus on the relationship between them. Subsequently, we address the recovery of the formulation in terms of PDE starting from the mixed variational formulations.

MSC: 35J65, 49J40, 74M15.

keywords: boundary value problem, nonlinear boundary condition, obstacle model, mixed variational formulations, Lagrange multipliers, weak solution.

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