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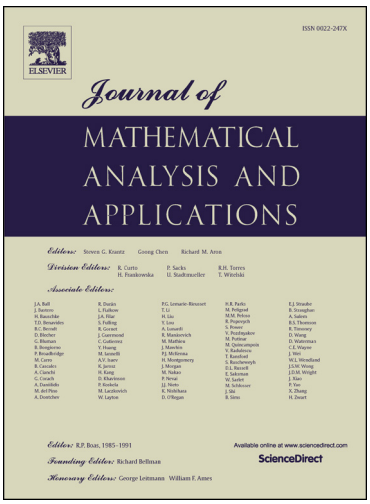

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On the rate of convergence of solutions in free boundary problems via penalization

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Abstract

The rate of convergence of approximate solutions via penalization for free boundary problems are concerned. A key observation is to obtain global bounds of penalized terms which give necessary estimates on integrations by the nonlinear adjoint method by L. C. Evans.

Key words: obstacle problem, gradient constraint, weakly coupled system, penalization, rate of convergence

2010 Mathematics Subject Classification: 35J60, 35J86, 35J88, 35R35, 49J10

1 Introduction

We are concerned with Bellman/Isaacs equations, which arise in free boundary problems. A typical example of Bellman equations is a unilateral obstacle problem

$$\max\{-\Delta u - f, u - \psi\} = 0 \quad \text{in } \Omega \tag{1.1}$$

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