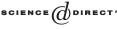


Available online at www.sciencedirect.com







www.elsevier.com/locate/na

Lipschitz continuous dynamic programming with discount $\stackrel{\leftrightarrow}{\succ}$

Jose M. Maroto^a, Manuel Moran^{b,*}

^aDepartment of Estadística e Investigación Operativa II, Universidad Complutense, 28223 Madrid, Spain ^bDepartment of Fundamentos del Análisis Económico I, Universidad Complutense, 28223 Madrid, Spain

Received 17 March 2005; accepted 23 March 2005

Abstract

We show that if the return function, the technological constraints and the transition function of a standard problem of stochastic dynamic programming with discount satisfy Lipschitz regularity assumptions, then the value function is Lipschitz regular. © 2005 Elsevier Ltd. All rights reserved.

Keywords: Dynamic programming; Optimization; Optimal growth; Renewable resources; Non-smoothness

1. Introduction

The results of this paper stand for a class of dynamic optimization problems with infinite horizon and discount, in a stochastic setting, as described by Stokey et al. [29, Chapters 4, 9].

It is well known that, under topological assumptions (compactness and continuity) on the data of the problem (i.e., state space, return function and technological constraint correspondence), the existence, uniqueness and continuity of the value function is guaranteed.

The theory of dynamic programming with discount proceeds by completing the topological assumptions with a rather extensive block of assumptions, which we call standard assumptions, including concavity, smoothness and monotonicity of the data. Such assumptions guarantee the concavity, smoothness and numerical computability of the value function

E-mail addresses: maroto@ccee.ucm.es (J.M. Maroto), mmoranca@ccee.ucm.es (M. Moran).

0362-546X/\$ - see front matter © 2005 Elsevier Ltd. All rights reserved. doi:10.1016/j.na.2005.03.100

 $[\]stackrel{\scriptscriptstyle{\rm tr}}{\to}$ This research has been supported by Ministerio de Ciencia y Technología, research project BMF2003–08204/Mate.

^{*} Corresponding author. Tel.: +34 913942407; fax: +34 913942561.