

GALERKIN-LIKE METHOD AND GENERALIZED PERTURBED SWEEPING PROCESS WITH NONREGULAR SETS

By:[Jourani, A](#) (Jourani, Abderrahim)^[1]; [Vilches, E](#) (Vilches, Emilio)^[1,2]

SIAM JOURNAL ON CONTROL AND OPTIMIZATION

Volume: 55

Issue: 4

Pages: 2412-2436

DOI: 10.1137/16M1078288

Published: 2017

Document Type: Article

[View Journal Impact](#)

Abstract

In this paper we present a new method to solve differential inclusions in Hilbert spaces. This method is a Galerkin-like method where we approach the original problem by projecting the state into a n -dimensional Hilbert space but not the velocity. We prove that the approached problem always has a solution and that, under some compactness conditions, the approached problems have a subsequence which converges strongly pointwisely to a solution of the original differential inclusion. We apply this method to the generalized perturbed sweeping process governed by nonregular sets (equi-uniformly subsmooth or positively α -far). This differential inclusion includes Moreau's sweeping process, the state-dependent sweeping process, and second-order sweeping process for which we give very general existence results.

Keywords

Author Keywords: [sweeping process](#); [subsmooth sets](#); [positively alpha-far sets](#); [differential inclusions](#); [second-order sweeping process](#); [normal cone](#)

KeyWords Plus: [BANACH-SPACES](#); [DIFFERENTIAL INCLUSION](#); [HILBERT-SPACE](#); [EXISTENCE](#); [STATE](#); [UNIQUENESS](#)

Author Information

Reprint Address: Jourani, A (reprint author)

+ Univ Bourgogne Franche Comte, Inst Math Bourgogne, UMR 5584, CNRS, BP 47870, F-21078 Dijon, France.

Addresses:

+ [1] Univ Bourgogne Franche Comte, Inst Math Bourgogne, UMR 5584, CNRS, BP 47870, F-21078 Dijon, France

+ [2] Univ Chile, Dept Ingn Math, Beauchef 851, Santiago, Chile

E-mail Addresses: abderrahim.jourani@u-bourgogne.fr; emilio.vilches@u-bourgogne.fr

Funding

Funding Agency	Grant Number
CONICYT-PCHA/Doctorado Nacional	2013-21130676

[View funding text](#)

Publisher

SIAM PUBLICATIONS, 3600 UNIV CITY SCIENCE CENTER, PHILADELPHIA, PA 19104-2688 USA

Journal Information

- **Impact Factor:** [Journal Citation Reports](#)

Categories / Classification

Research Areas:Automation & Control Systems; Mathematics

Web of Science Categories:Automation & Control Systems; Mathematics, Applied