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STRONG STATIONARITY FOR THE CONTROL OF VISCOUS HISTORY-DEPENDENT EVOLUTIONARY VIS ARISING IN APPLICATIONS*

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

Abstract

This paper addresses optimal control problems governed by history-dependent EVIs with viscosity. One of the prominent properties of the state system is its nonsmooth nature, so that the application of standard adjoint calculus is excluded. We extend previous results by showing that history-dependent EVIs with viscosity can be formulated as nonsmooth ODEs in Hilbert space in a general setting. The Hadamard directional differentiability of the solution map is then investigated. This allows us to establish strong stationary conditions for two different viscous damage models with fatigue.
MSC: 34G25, 34K35, 49J40, 49K21, 74R99.

keywords: history-dependence, evolutionary VIs with viscosity, nonsmooth optimization, strong stationarity, fatigue, viscous damage evolution.

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