Optimal Control For Nonlinear Parabolic Distributed Parameter Systems With Numerical Analysis

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Optimal Control For Nonlinear Parabolic
After established the fundamental existence and uniqueness results, we have developed the nonlinear optimal control theory for the equations having uniform Lipschitz continuous nonlinearity. Then we have applied the theoretical results to practical nonlinear parabolic partial differential equations including reaction-diffusion equations, diffusion Hopfield neural network equations.

Optimal Control for Nonlinear Parabolic Distributed ...
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Optimal Control of Nonlinear Parabolic Systems: Theory ...
Because of the complexity of nonlinear parts of the parabolic–elliptic system, there has been no research on the optimal control and boundary control of this equation. In this paper, we study the distributed optimal control problem for the parabolic–elliptic system using a series of mathematical estimates.

Optimal control of a nonlinear parabolic–elliptic system ...
Control of systems modelled by non-linear partial differential equations (PDE’s) has been studied for a number of applications, including wastewater treatment ... C. Li, E. Feng, J. Liu, Optimal control of systems of parabolic PDEs in exploitation of oil, Journal of Applied Mathematics and Computing 13 (1) (2003) 247.

Optimal Controller and Actuator Design for Nonlinear ...
(2018). Optimal control problem for cancer invasion parabolic system with nonlinear diffusion. Optimization: Vol. 67, No. 10, pp. 1819-1836.

Optimal control problem for cancer invasion parabolic ...
The goal of this article is to propose an efficient way of empirically improving suboptimal solutions designed from the recent method of finite-horizon parameterizing manifolds (PMs) introduced by Chekroun and Liu (Acta Appl. Math., 2015) and concerned with the (sub)optimal control of nonlinear parabolic partial differential equations (PDEs). Given a finite horizon [0, T] and a reduced low-mode phase space, a finite-horizon PM provides an approximate parameterization of the high modes by ...

Nonlinear Optimal Control | Mickaël D. Chekroun
Maximal discrete sparsity in parabolic optimal control with measures. Mathematical Control & Related Fields, 2020 doi: 10.3934/mcrf.2020018 [4] William G. Litvinov. Optimal control of electrorheological clutch described by nonlinear parabolic equation with nonlocal boundary conditions.

Second order optimality conditions for optimal control of ...
The optimal boundary control problem is studied for coupled parabolic PDE–ODE systems. The linear quadratic method is used and exploits an infinite-dimensional state-space representation of the coupled PDE–ODE system. Linearization of the nonlinear system is established around a steady-state profile.

Optimal boundary control of coupled parabolic PDE–ODE ...
DOI: 10.3934/dcds.2000.6.431 Corpus ID: 9154700. Second order sufficient optimality conditions for nonlinear parabolic control problems with state constraints @article{Raymond2000SecondOS, title={Second order sufficient optimality conditions for nonlinear parabolic control problems with state constraints}, author={J. Raymond and F. Tr{\"o}ltzsch}, journal={Discrete and Continuous Dynamical ...

[PDF] Second order sufficient optimality conditions for ...
Optimal control problems for distributed parameter systems governed by semilinear parabolic equations in L 1 and L ∞ spaces. In Optimal Control of Partial Differential Equations, Hoffmann, K. H. and Krabs, W., eds, Lecture Notes in Control and Information Sciences 149, pp. 68–80 (Berlin: Springer, 1991). CrossRef | Google Scholar

Optimal control of quasilinear parabolic equations ...
Motivated by the current profile control problem in nuclear fusion reactors, we study in this thesis a particular class of nonlinear parabolic PDEs that admit interior, boundary and diffusivity actuation. We make in this way theoretical and practical contributions to control systems and nuclear fusion respectively.

Optimal control of a class of nonlinear parabolic PDE ...
(2004) Optimal control of the heat equation in an inhomogeneous body. Journal of Applied Mathematics and Computing 15 :1-2, 127-146. (1995) OPTIMIZATION IN A NONLINEAR PARABOLIC SYSTEM WITH A CONTROL IN THE COEFFICIENTS.

Nonlinear Optimal Control Problems for Parabolic Equations ...
Book Description This book discusses theoretical approaches to the study of optimal control problems governed by non-linear evolutions - including semi-linear equations, variational inequalities and systems with phase transitions. It also provides algorithms for solving non-linear parabolic systems and multiphase Stefan-like systems.

Optimal Control of Nonlinear Parabolic Systems: Theory ...
Abstract: This paper addresses the approximate optimal control problem for a class of parabolic partial differential equation (PDE) systems with nonlinear spatial differential operators. An approximate optimal control design method is proposed on the basis of the empirical eigenfunctions (EEFs) and neural network (NN).

Approximate Optimal Control Design for Nonlinear One ...
Chekroun, Mickaël D., and Honghu Liu. 2015. “Finite-Horizon Parameterizing Manifolds, and Applications to Suboptimal Control of Nonlinear Parabolic PDEs.” Acta Applicandae Mathematicae 135 (1): 81–144.

Finite-Horizon Parameterizing Manifolds, and Applications ...
CiteSeerX - Document Details (Isaac Councill, Lee Giles, Pradeep Teregowda): In this paper, optimal control problems for semilinear parabolic equations with distributed and boundary controls are considered. Pointwise constraints on the control and on the state are given. Main emphasis is laid on the discussion of second order sufficient optimality conditions.

CiteSeerX — Second Order Sufficient Optimality Conditions ...
Title: Space-time Galerkin POD with application in optimal control of semi-linear parabolic partial differential equations. ... show its application for the optimal control of nonlinear PDEs, and, by means of a numerical example with Burgers' equation, discuss the competitiveness by comparing to standard approaches.

Space-time Galerkin POD with application in optimal ...
Due to the need for numerical calculation and mathematical modelling, this paper focuses on the stability of optimal trajectories for optimal control problems. The basic ideas and techniques are based on the compactness of the optimal trajectory set and set-valued mapping theorem. Through lack of optimal control stability, the result of generic stability for optimal trajectories is obtained ...

Stability Analysis of Optimal Trajectory for Nonlinear ...
of a recent result of the author from linear to a class of nonlinear feedback operators. The paper is concluded with a brief description of open problems and future directions. Key words: Parabolic Evolution Equations, Uncertain Systems, Output Feedback, Optimal Boundary Control, Optimal Feedback Operators.

OPTIMAL CHOICE OF NONLINEAR OUTPUT FEEDBACK CONTROL LAW ...
The system dynamics in MPC is a heat transfer model characterized by the nonlinear parabolic partial differential equations (PDEs). This paper presented two algorithms. ... an optimal control problem.