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ON THE BANG-BANG PRINCIPLE FOR PARABOLIC OPTIMAL CONTROL PROBLEMS*

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

Abstract

Optimal control problems for the linear heat equation with final observation and pointwise constraints on the control are considered, where the control depends only on the time. It is shown that to each finite number of given switching points, there is a final target such that the optimal objective value is positive, the optimal control is bang bang, and has the desired switching structure. The theory is completed by numerical examples.

MSC: 49K20, 49K30, 49M05

keywords: optimal control, heat equation, bang-bang principle, finitely many switching points

1 Introduction

In this paper, we discuss the construction of parabolic optimal control problems with time-dependent control, such that the optimal control has a desired switching structure. Our main result is that, for each given set of

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