



# Necessary and Sufficient Optimality Conditions for a Control Fuzzy Linear Problem

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## Abstract

In the present paper, we show the some properties of the fuzzy solution of the control linear fuzzy differential equations and research the optimal time problems for it.

*Keywords* : Fuzzy differential equations; Control problems.

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## 1 Introduction

In recent years, the fuzzy set theory introduced by Zadeh [32] has emerged as an interesting and fascinating branch of pure and applied sciences. The applications of fuzzy set theory can be found in many branches of regional, physical, mathematical, differential equations and engineering sciences. Recently there have been new advances in the theory of fuzzy differential equations [1, 7, 6, 7, 9, 10, 11, 12, 13, 14, 16, 17, 19, 20, 21, 27, 29, 31], inclusions [28, 22] and differential inclusions with fuzzy right-hand side [17, 3, 4, 5, 8] as well as in the theory of control fuzzy differential equations [15, 23, 24, 25] and control differential inclusions with fuzzy right-hand side [18, 30].

In this article we are going to consider the some properties of the fuzzy solution of the control linear fuzzy differential equations and research the optimal time problems for it.

## 2 The fundamental definitions and designations

Let  $comp(R^n)$  ( $conv(R^n)$ ) be a set of all nonempty (convex) compact subsets from the space  $R^n$ ,

$$h(A, B) = \min_{r \geq 0} \{S_r(A) \supset B, S_r(B) \supset A\}$$

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