Dynamics of Continuous, Discrete and Impulsive Systems
Series **A:** *Mathematical Analysis* **19 (2012)** 335-355
 http://www.watam.org

MINIMAX FRACTIONAL INTEGRAL PROGRAMMING PROBLEMS INVOLVING UNIVEXITY

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Abstract. In this paper, we consider the problem that consists of minimizing a maximum of several time dependent ratios involving integral expressions. We establish optimality conditions based on the generalized univexity. Furthermore, we explore the Wolfe type dual model, Mond-Weir type dual model, one parameter dual model and Mixed type dual model, and then establish weak, strong and strict converse duality theorems under generalized univexity conditions.

Keywords. Nondifferentiable fractional variational programming; Invexity; Quasiinvexity Pseudoinvexity; Duality.

AMS (MOS) subject classification: 49K50, 90C32.

1 Introduction

Fractional programming is one of the most application-enhanced areas of optimization which features in several types of practical problems. It can be applied to different branches of engineering as well as to economics to minimize a ratio of functions between given periods of time. Furthermore it can be utilized as a resource in order to measure the efficiency or productivity of a system. In such type of problems the objective function is given as a ratio of functions (see Stancu-Minasian [10]).

In the present paper, we consider a problem that deals with minimizing a maximum of several time dependent ratios involving integral expressions. Several researchers have investigated this type of problem, including Chen and Lai [2], Chandra et al. [1], Craven [3], Crouzeix et al. [4], Lee and Lai [7], Mond et al. [8], and Mond and Husain [9], while we extend the results of Lai [5] and Lai and Liu [6] to the case of the generalized univexity. As our problem involves a state function $x(t)$ in the integrand of the integration, the obtained results also relate to the problems on optimal control. For more details, we refer the reader [11-13].