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APPLICATION OF MODIFIED OBJECTIVE FUNCTION METHOD FOR MULTITIME MULTIOBJECTIVE UNIVEX VARIATIONAL PROBLEMS

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Abstract. In this study, we focus on the modified objective function approach for non-convex multitime multiobjective variational problems. In this approach, we construct a new multitime multiobjective variational problem by modifying the objective function of the initial multitime multiobjective variational problem. We establish an equivalence between an efficient solution to the initial multitime multiobjective variational problem and its corresponding modified problem by assuming univexity. Thereafter, we investigate the modified saddle point results using generalized univexity assumptions. We also present an example of operation research problem to illustrate the theoretical aspects.

Keywords. Multitime multiobjective variational problems, Modified objective function method, Optimality conditions, Generalized univex functions.

AMS (MOS) subject classification: 49J20, 65K10, 93C35.

1 Introduction

Many real-life problems related to economics, traffic control, game theory, portfolio selections, sustainable transportation networks, weather forecasts, and the allocation of healthcare resources during the COVID-19 pandemic required to deal with a number of comptative objectives instead of a single objective problem as a whole. These types of problem are referred to as multiobjective or multicriteria optimization problems. There are numerous approaches to dealing with multiobjective optimization problems. One of these approaches is the efficient technique, which allow us to identify a set of solutions that defines the best solutions among comptative situations.

Convexity theory has a significant factor in optimization problems. However, there are various type of optimization problems for which the convexity idea is not enough to prove the essential results. Therefore, a broad generalization of