DUALITY FOR NONDIFFERENTIABLE MULTIOBJECTIVE VARIATIONAL PROBLEMS WITH GENERALIZED TYPE I FUNCTIONS

I. Ahmad[1*], S. Al-Homidan[1] and Sarita Sharma[2]
[1]Department of Mathematics and Statistics
King Fahd University of Petroleum and Minerals, Dhahran-31261, Saudi Arabia
[2]Department of Mathematics, Indian Institute of Technology, Roorkee-247 667, India
Corresponding author email: drizhar@kfupm.edu.sa

Abstract. This paper deals with a nondifferentiable multiobjective variational programming problem. Weak, strong and strict converse duality results are derived for its Wolfe and Mond-Weir type duals involving (F, α, ρ, d)-type I functions.

Keywords. Multiobjective variational programming· Nondifferentiable programming· Generalized (F, α, ρ, d)-type I functions· Duality

Mathematices Subject Classification: 90C29; 49N15, 90C46

1 Introduction

Courant and Hilbert [5] presented a dual relationship for a simple type of unconstrained variational problem. Subsequently, Hanson [8] pointed out that some of the duality results of mathematical programming have analogues in variational calculus. Exploring this relationship between mathematical programming and the classical calculus of variations, Mond and Hanson [12] formulated a constrained variational problem as a mathematical programming problem and presented its Wolfe type dual for validating various duality results under convexity. Later, Bector et al. [2] studied duality theorems for variational programming problems involving weaker convexity assumptions. In [3], Bector and Husain extended the results of Mond and Hanson [12] and Bector et al. [2] to multiobjective case. They established duality relations for Wolfe and Mond-Weir type duals of multiobjective variational problems under convexity. Ahmad and Gulati [1] obtained various mixed-type duality results for multiobjective variational problems under generalized (F, ρ)-convexity. Recently, Kim and Kim [10] introduced generalized V-type I invex functions for variational problems and discussed sufficiency and duality results. More recently, Hachimi and Aghezzaf [7] extended the concept of generalized (F, α, ρ, d)-type I functions [6] to continuous case and established mixed duality results for multiobjective variational programming problems.

Chandra et al. [4] considered the following scalar nondifferentiable variational programming problem:

---

*Permanent Address: Department of Mathematics, Aligarh Muslim University, Aligarh-202002, India