



Nondifferentiable multiobjective symmetric duality with F -convexity over cones

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ABSTRACT

In the present paper, a pair of Wolfe type nondifferentiable multiobjective second-order symmetric dual programs over arbitrary cones are formulated. Using the concept of weak efficiency with respect to a convex cone, weak, strong and converse duality theorems are studied under second-order K - F -convexity assumptions. Self-duality is also discussed.

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1. Introduction

The duality in linear programming is symmetric, i.e., the dual of the dual is the primal problem. This is not the case in nonlinear programming in general. Dorn [1] introduced the concept of symmetric duality in quadratic programming. His results were extended to general nonlinear programs involving convex/concave functions by Dantzig et al. [2] and then by Bazaraa and Goode [3] over cone constraints. Chandra et al. [4] studied symmetric duality in mathematical programming under F -convexity/ F -pseudoconvexity for Wolfe and Mond–Weir type models. Kim et al. [5] constructed a pair of multiobjective symmetric dual programs for pseudo-invex functions over arbitrary cones and obtained various duality results. Multiobjective symmetric dual programs over cones in which the objective function is optimized with respect to a cone have been discussed in [6–9]. Recently, Kim and Lee [10] studied nondifferentiable higher-order multiobjective dual programs involving cone constraints and established duality results under higher-order generalized convexity assumptions.

Mangasarian [11] introduced the concept of second-order duality in nonlinear programming. He indicated that it provides tighter bounds for the value of objective functions. This motivated several researchers in this field. Second-order symmetric duality involving nondifferentiable functions has been discussed by Hou and Yang [12] for Mond–Weir type duals, and by Ahmad and Husain [13] and Yang et al. [14] for Wolfe type duals. Yang et al. [15], and Gupta and Kailey [16] studied multiobjective second-order symmetric duality under F -convexity.

In this paper, we have formulated Wolfe type nondifferentiable second-order multiobjective symmetric dual programs over arbitrary cones. Using the concept of weak efficiency with respect to a convex cone, weak, strong and converse duality theorems have been established under second-order K - F -convexity assumptions. Some of the known results are obtained as special cases. Self-duality for our programs has also been discussed.

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