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Nondifferentiable multiobjective symmetric dual programs over cones

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ABSTRACT

Wolfe and Mond–Weir type nondifferentiable multiobjective symmetric dual programs are formulated over arbitrary cones and appropriate duality theorems are established under K-preinvexity/K-convexity/pseudoinvexity assumptions.

1. Introduction

In mathematical programming, a pair of primal and dual problems is called symmetric if the dual of the dual is the primal. The duality in linear programming is symmetric. It is not so in nonlinear programming in general. Dorn [1] introduced the concept of symmetric duality in quadratic programming. His results were extended to nonlinear convex programming problems by Dantzig et al. [2] and later by Bazaraa and Goode [3] over arbitrary cones. Nanda and Das [4] studied the symmetric dual fractional programming problem and Kim et al. [5] studied a pair of multiobjective symmetric dual programs. The problems in [4,5] contain cone constraints and the functions involved are assumed to be pseudoinvex.

Cambini [6] has studied several classes of vector-valued functions which are extensions of scalar generalized concavity using three order relations generated by a cone K or the interior of K, or the cone K without the origin in R^p ($p \geq 2$). Suneja et al. [7] formulated a pair of Wolfe type symmetric dual multiobjective programs over arbitrary cones in which the objective function is optimized with respect to an arbitrary closed convex cone K by assuming the functions involved to be K-convex. Khurana [8] extended these results for Mond–Weir type multiobjective symmetric duals under K-pseudoinvexity assumptions.

Recently, Kim and Kim [9] formulated a pair of Wolfe type and Mond–Weir type nondifferentiable multiobjective symmetric dual problems with cone constraints and obtained symmetric duality results on the basis of weak efficiency, under cone-invexity and cone-pseudoinvexity.

In this paper, we consider Wolfe and Mond–Weir type multiobjective symmetric dual programs involving nondifferentiable functions over arbitrary cones and prove duality results under K-preinvexity/K-convexity/pseudoinvexity assumptions.

2. Preliminaries

We consider the following multiobjective programming problem:

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