

On optimality and duality results for multi-objective E -variational problems and application to cake eating problem

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Abstract

In this paper, the concept of E -convexity is introduced as an extension of convexity defined for variational optimization problems. The class of multi-objective variational problems in which the functions involved are (not necessarily differentiable) E -differentiable has been studied in this paper and to solve this problem corresponding multi-objective E -variational problem is constructed using the E operator. Under the hypothesis of E -convexity, the necessary and sufficient optimality conditions for the multi-objective E -variational programming problem are derived. The Mond-Weir dual problem has been formulated for the multi-objective E -variational problem, and duality results have been obtained under the E -convexity. Furthermore, we have studied a cake eating problem, and the solution to this problem is obtained using the sufficiency theorem, to highlight the importance of the results developed in this paper. Non-trivial examples are also included in the paper at appropriate places to support the findings.

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