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OPTIMALITY CONDITIONS FOR E-DIFFERENTIABLE VECTOR OPTIMIZATION PROBLEMS WITH THE MULTIPLE INTERVAL-VALUED OBJECTIVE FUNCTION

Tadeusz Antczak

Faculty of Mathematics and Computer Science University of Łódź
Banacha 22, 90-238 Łódź, Poland

Najeeb Abdulaleem*

Department of Mathematics, Hadhramout University
P.O. BOX : (50511-50512), Al-Mahrah, Yemen

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Abstract. In this paper, a nonconvex vector optimization problem with multiple interval-valued objective function and both inequality and equality constraints is considered. The functions constituting it are not necessarily differentiable, but they are E-differentiable. The so-called E-Karush-Kuhn-Tucker necessary optimality conditions are established for the considered E-differentiable vector optimization problem with the multiple interval-valued objective function. Also the sufficient optimality conditions are derived for such interval-valued vector optimization problems under appropriate (generalized) E-convexity hypotheses.

1. **Introduction.** In mathematical programming, we usually deal with real numbers which are assumed to be fixed. However, in many real-life situations, the coefficients of decision support models are not exactly known and, therefore, data suffer from inexactness. In other words, we often encounter cases where the information items can't be determined with certainty. The interval-valued optimization problems are closely related to optimization problems with inexact data. According to the decision maker's point of view under changeable conditions, we may replace the real numbers by the interval numbers to formulate optimization problems more appropriately. Therefore, the interval-valued optimization problems have been of much interest in recent past and thus explored the extent of optimality conditions and duality applicability in different areas (see, for example, [1], [2], [4], [5], [7], [13], [14], [15], [16], [17], [18], [19], [25], [26], [29], [30], [35], [36], and others).

Several generalizations of the definition of a convex function have been introduced to optimization theory in order to weaken an assumption of convexity for establishing optimality and duality results for new classes of nonconvex optimization problems, including vector optimization ones. Youness [32] brought forward

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* Corresponding author: Najeeb Abdulaleem.