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Optimality conditions for bilevel optimization problems with interval-valued functions via approximations

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Abstract

This paper investigates the necessary optimality conditions for a multiobjective bilevel optimization problem in which both the upper and lower-level objective functions are interval-valued. By reformulating the hierarchical model into a single-level problem through optimal value reformulation, we derive Karush-Kuhn-Tucker-type optimality conditions under an appropriate nonsmooth Abadie-type constraint qualification, expressed in terms of approximations. Examples are provided to demonstrate the applicability of our findings and to underscore the limitations of certain previously published results.

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References

- [1] Dempe S, Gadhi NA, Ohda M. On interval-valued bilevel optimization problems using upper convexificators. *RAIRO-Oper Res.* 2023;57:1009–1025. doi: 10.1051/ro/2023044.
- [2] Wu H-C. The Karush-Kuhn-Tucker optimality conditions in an optimization problem with interval-valued objective function. *Eur J Oper Res.* 2007;176:46–59. doi:10.1016/j.ejor.2005.09.007.
- [3] Gadhi NA, Ohda M. Necessary optimality conditions for a bilevel multiobjective problem in terms of approximations. *Optimization.* 2025;74:1273–1289. doi: 10.1080/02331934.2023.2295471.
- [4] Upadhyay BB, Stancu-Minasian IM, Mishra P. On relations between nonsmooth interval valued multiobjective programming problems and generalized Stampacchia vector variational inequalities. *Optimization.* 2023;72:2635–2659. doi: 10.1080/02331934.2022.2069569.
- [5] Tung LT. Karush-Kuhn-Tucker optimality conditions and duality for convex semi-infinite-programming with multiple interval-valued objective functions. *J Appl Math Comput.* 2020;62:67–91. doi: 10.1007/s12190-019-01274-x.