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Interval Bilevel Linear Fractional Programming

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Abstract : The Bilevel Programming (BP) model has been presented for a decision making process that consists of two decision makers in a hierarchical structure. In fact, BP is a model for a static two person game (the leader player in the upper level and the follower player in the lower level) wherein each player tries to optimize his/her personal objective function under dependent constraints; this game is sequential and non-cooperative. The decision making variables are divided between the two players and one's choice affects the other's benefit and choices. In other words, BP consists of two nested optimization problems with two objective functions (upper and lower) where the constraint region of the upper level problem is implicitly determined by the lower level problem. In real cases, the coefficients of an optimization problem may not be precise, i.e. they may be interval. In this paper we develop an algorithm for solving interval bilevel linear fractional programming problems. That is to say, bilevel problems in which both objective functions are linear fractional, the coefficients are interval and the common constraint region is a polyhedron. From the original problem, the best and the worst bilevel linear fractional problems have been derived and then, using the extended Charnes and Cooper transformation, each fractional problem can be reduced to a linear problem. Then we can find the best and the worst optimal values of the leader objective function by two algorithms.

Keywords : best and worst optimal solutions, bilevel programming, fractional, interval coefficients
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