On the exactness of the ε-constraint method for biobjective nonlinear integer programming

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Abstract. The ε-constraint method is a well-known scalarization technique used for multiobjective optimization. We explore how to properly define the step size parameter of the method in order to guarantee its exactness when dealing with problems having two nonlinear objective functions and integrality constraints on the variables. Under specific assumptions, we prove that the number of nonlinear integer subproblems that the method needs to address to detect the complete Pareto front is finite. We report numerical results on portfolio optimization instances built on real-world data and compare the ε-constraint method with an existing criterion space algorithm for biobjective nonlinear integer programming.

Keywords: Multiobjective Optimization; Integer Programming; ε-constraint Algorithm; Criterion Space Algorithms;

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