Generalization of the Method Based on Parameterization Developed for Solving Integer Linear Programming Problems

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Abstract: This study presents the generalization of methods based on parameterization proposed for solving integer programming problems with linear objectives and linear constraints. Initially, the method based on parameterization, proposed for solving 2, 3, and 4-variable integer linear programming problems, is generalized to n-variable integer linear programming problems. The proposed method relies on the parameterization obtained from Diophantine equations. Using this parameterization, the original problem is reformulated as another integer linear programming problem that can be solved more efficiently using simple mathematical programming. The method can be used regardless of the number of constraints of the problem and also provides all alternative solutions to the decision maker. It is demonstrated with some examples that this method provides an efficient algorithm.
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