**Generalized Simplex Method**

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Abstract

The generalized simplex method is an algorithm used to solve linear programming problems, which are optimization problems where the objective function and constraints are linear. The method is an extension of the standard simplex method, which is a popular algorithm for solving linear programming problems.

The generalized simplex method works by starting with an initial feasible solution and iteratively improving it by moving along edges of a matroid in a way that decreases the objective function. A matroid is a mathematical object that generalizes the notion of a linearly independent set of vectors. The edges of a matroid are defined by a set of basis vectors, and the algorithm works by moving along the edges of the matroid in a way that maintains feasibility and decreases the objective function

The generalized simplex method has been shown to have several advantages over the standard simplex method, including better worst-case complexity bounds and better performance on certain classes of problems. However, it can be more difficult to implement and understand than the standard simplex method.