A New Acceleration Method for the Column Generation

Abstract

The column generation is one of dominant approaches to tackle large size mathematical programming problems, especially integer programming problems. In spite of its success as a practical solution method, classical column generation often shows desperately slow convergence. Recently, many acceleration techniques have been proposed to improve the convergence. We briefly survey these methods, and propose a new one based on Chebyshev center of dual polyhedron. The Chebyshev center can be obtained by linear programming, so our method can be applied with small modifications on the classical column generation procedure. We also show that the performance can be enhanced by introducing proximity parameters which enable us to adjust the position of the Chebyshev center. Numerical experiments are conducted on the binpacking, vehicle routing problem with time windows, and generalized assignment problem. Computational results show the effectiveness of our method.