

Using Layer Patterns in Solving the Two-Dimensional Cutting Stock Problem

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Abstract

The two-phase cutting process is often used to divide stock plates into rectangular items. At the first phase, an automatic machine with multiple parallel cutters divides the plate into several sections in one pass. The sections are divided into blanks by simple equipments at the second phase. This paper focuses on the two-dimensional cutting stock problem of rectangular items, where the two-phase process is applied. Layer patterns are used because they are useful for the improvement of the efficiency of the cutting process. The algorithm is based on linear programming approach (LPA). In each cycle of the simplex iteration, it calls a dynamic programming procedure to generate an optimal layer pattern, and introduces it into the base matrix to obtain a new solution. Each LPA solution (often fractional) is rounded to obtain the integer solution. The best integer solution is taken as the final solution. The computational results indicate that layer patterns are useful for two-dimensional stock cutting.

Keywords: Two-dimensional cutting, cutting stock, layer patterns.