

## **Resolution of the one dimensional cutting stock problem with usable leftovers and limited number of retails**

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In this work we present a study about the one-dimensional cutting stock problem with usable leftovers (CSPUL). The study which involves the CSPUL is recent in the literature and few papers have presented a mathematical model to obtaining solution for such problems. Usually, the cutting stock problem with usable leftovers consists in produce a set of items by cutting large units (objects) of standard sizes (objects bought from suppliers) or non-standard (objects that are retails of previous cuts). The main objective is obtaining minimal waste with the possibility of some retails returning to stock to meet future demands of items. This way, we present the study of a recent mathematical model of the literature to solve the CSPUL which consider several types of objects in stock with limited quantities and different associated costs. The lengths to the possible retails are previously defined such way they are considered during the cutting process. From this model, we propose some modifications in the parameters used and in the resolution method. Moreover, we use a different heuristic procedure from that proposed to obtain an integer solution with some modifications to consider the usable leftovers. In order to analyze the solutions, random generated instances based in the work from the literature were developed. In this random generator, witch considers a large variety of items with high demand, successive problems are solved in a time horizon. For each period, new demands arise and a new problem is solved considering information about the stock of previous periods and retails generated in previous periods. To prioritize the use of retails during the cutting process, they have associated costs. The performed computational experiments have shown a good performance of the developed strategy.

**KEYWORDS.** Cutting stock problem. Usable Leftover. Column generation.  
Combinatorial optimization

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