The Third International Conference "Problems of Cybernetics and Informatics"
September 6-8, 2010, Baku, Azerbaijan. Section #3 "Modeling and Identification"
www.pci2010.science.az/3/28.pdf

MULTI-OBJECTIVE MATHEMATICAL MODEL FOR ONE-DIMENSIONAL ASSORTMENT PROBLEMS

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Abstract

In this paper, we study a one-dimensional cutting stock and assortment problem. We aim to handle the main difficulties faced in modeling these problems. One of the main difficulties in formulating and solving mathematical models of one-dimensional assortment problems is the use of a set of cutting patterns as a parameter set. Since the total number of cutting patterns to be generated may be very huge, both the generation and the use of such a set lead to computational difficulties in solution process. In this paper, a new three-objective linear integer programming model without the use of a set of cutting patterns is developed. The objectives are related to the trim loss amount, the total number of different standard lengths used, and the production amount that exceeds the given demand for each cutting order. The advantages of the proposed mathematical model are demonstrated on test problems.

Keywords: One-dimensional assortment problem; Cutting stock problem; Stock size selection; Trim loss minimization; Multi-objective optimization.