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An Approximation Algorithm for the Non Orthogonal Cutting Problem

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Abstract : We study the problem of cutting a rectangular material entity into smaller sub-entities of trapezoidal forms with minimum waste of the material. This problem will be denoted TCP (Trapezoidal Cutting Problem). The TCP has many applications in manufacturing processes of various industries: pipe line design (petro chemistry), the design of airfoil (aeronautical) or cuts of the components of textile products. We introduce an orthogonal build to provide the optimal horizontal and vertical homogeneous strips. In this paper we develop a general heuristic search based upon orthogonal build. By solving two one-dimensional knapsack problems, we combine the horizontal and vertical homogeneous strips to give a non orthogonal cutting pattern.

Keywords : combinatorial optimization, cutting problem, heuristic
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