

Metaheuristics/NLP Hybrids for Variants of the Rectangle Packing Problem

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We propose metaheuristic and NLP (nonlinear programming) hybrid algorithms for solving variants of the rectangle packing problem. The variants include such problems in which:

1. Rectangles are "soft" in the sense that their shapes are adjustable within given perimeter and area constraints,
2. Rectangles have weights as well as their heights and widths, and constraints on the location of their center of gravity and the sum of their moments are imposed.

Using "sequence pairs" to specify relative positions of rectangles, we solve the resulting linear or convex programming problems to determine sizes and locations of all rectangles. To find good sequence pairs, we then resort to local search/metaheuristic techniques.

Our preliminary experiments show that the resulting algorithms can handle problem instances with up to 50 rectangles in reasonable amount of time.