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Packing rectangles in a strip. (English) Zbl 1034.68126

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Summary: Rectangles with dimensions independently chosen from a uniform distribution on $[0, 1]$ are packed on-line into a unit-width strip under a constraint like that of the Tetris™ game: rectangles arrive from the top and must be moved inside the strip to reach their place; once placed, they cannot be moved again. Cargo loading applications impose similar constraints. This paper assumes that rectangles must be moved without rotation. For n rectangles, the resulting packing height is shown to have an asymptotic expected value of at least $(0.31382733\dots)n$ under any on-line packing algorithm. An on-line algorithm is presented that achieves an asymptotic expected height of $(0.36976421\dots)n$. This algorithm improves the bound achieved in Next Fit Level (NFL) packing, by compressing the items packed on two successive levels of an NFL packing via on-line movement admissible under the Tetris constraint.

MSC:

68W40 Analysis of algorithms

68Q10 Modes of computation (nondeterministic, parallel, interactive, probabilistic, etc.)

90B80 Discrete location and assignment

Cited in 2 Documents

Keywords:

[Tetris constraint](#)

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