

REVIEW: ORDER OF DECAY OF THE WASTED SPACE FOR A STOCHASTIC PACKING PROBLEM

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WanSoo T. Rhee's paper investigates the wasted space of a collection of rectangles in $[0, 1]^2$. The wasted space is defined as the area of $[0, 1]^2$ not covered by those rectangles. He further limits his discussion to a simple packing, in which any vertical line meets at most one rectangle of the packing.

The paper opens with the statement of a previous result, specifically that given a collection of N independent uniformly distributed subrectangles of $[0, 1]$, there exists K such that the wasted space W_N in an optimal simple packing of these rectangles satisfies

$$EW_N \leq \frac{K}{\sqrt{N}} \exp K \sqrt{\log N}$$

It then proceeds to investigate a lower bound for EW_N . Rhee shows that

$$\frac{1}{K\sqrt{N}} \exp \frac{1}{K} \sqrt{\log N} \leq EW_N.$$

Proving the lower bound amounts to proving that no strategy can produce an essentially better result, that is, a result with less wasted space. That is the method that Rhee pursues for the rest of the paper, and the one that ultimately proves his claim.

Problems like this are of fundamental importance to computer science, as Rhee notes in his introduction, and he seems to bear broader applications in mind as he proves the validity of the lower bound for EW_N .