

Cím: 2D knapsack: Packing squares

Szerzők: Yan Lan, György Dósa, Xin Han, Chenyang Zhou, Attila Benkő

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Absztrakt: In this paper, we study a two-dimensional knapsack problem: packing squares as many as possible into a unit square. Our results are the following:

- (i) we propose an algorithm called IHS (Increasing Height Shelf), and prove that the packing is optimal if in an optimal packing there are at most 5 squares, and this upper bound is sharp;
- (ii) if all the squares have side length at most $1/k$, we propose a simple and fast algorithm with an approximation ratio $(k^2+3k+2)/k^2$ in time $O(n \log n)$;
- (iii) we give an EPTAS for the problem, where the previous result in Jansen and Solis-Oba (2008) [16] is a PTAS, not an EPTAS. However our approach does not work on the previous model of Jansen and Solis-Oba (2008) [16], where each square has an arbitrary weight.