

Seminar AGCO

Speaker: Arturo Merino, TU-Berlin

Title: On the two-dimensional knapsack problem for convex polygons.

Abstract: We study the two-dimensional geometric knapsack problem for convex polygons. Given a set of weighted convex polygons and a square knapsack, the goal is to select the most profitable subset of the given polygons that fits non-overlappingly into the knapsack. We allow rotating the polygons by arbitrary angles.

In this talk we will first present:

- a quasi-poly time $O(1)$ -approximation
- a poly time $O(1)$ -approximation algorithm if all input polygons are triangles.

We will then look into the setting of resource augmentation, i.e., we allow to increase the size of the knapsack by a factor of $1 + \delta$ for some $\delta > 0$ but compare ourselves with the optimal solution for the original knapsack. In the resource augmentation setting we present:

- a poly time $O(1)$ -approximation
- a quasi-poly time algorithm that computes a solution of optimal weight.

To the best of our knowledge, these are the first results for two-dimensional geometric knapsack in which the input objects are more general than axis-parallel rectangles or circles and in which the input polygons can be rotated by arbitrary angles.

This is joint work with Andreas Wiese.

Wednesday October 28, 14:30 hrs (Chilean time).

Link: <https://zoom.us/j/95413798884?pwd=ait4K0J4WHFSZTVVMXdJN1VFVGfYzZ09>