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Computational Geometry — Exercise Set 4 — HS07

URL: http://www.ti.inf.ethz.ch/ew/courses/CG07/

Exercise 1 (10 points)

Let $P \subset \mathbb{R}^2$ be a finite point set with no four points on a circle. The projection of the lower convex hull of the lifted point set onto the x/y-plane gives the unique Delaunay Triangulation of P. (Lifting map defined as in the lecture: $(x, y) \mapsto (x, y, x^2 + y^2)$)

What about the projection of the upper convex hull? Give a characterization in the plane.

Exercise 2 (10 points)

Find an algorithm which triangulates a monotone polygon in linear time.

Exercise 3 (10 points)

Let P and Q be two convex polygons with n and m vertices. P and Q are given as sequence of their vertices in counter-clockwise order. Find an $O(n + m)$ time and space algorithm which computes $P \cap Q$. How can you modify this algorithm to compute $P \cup Q$ instead?

Due date: 29.10.2007