

Computational Geometry

Exercise Set 3

HS07

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

Exercise 1 (10 points)

How many triangulations does a convex polygon in \mathbb{R}^2 with $n \geq 3$ vertices have?

Exercise 2 (10 points)

The Euclidean minimum spanning tree (EMST) of a finite point set $M \subset \mathbb{R}^2$ is a spanning tree for which the sum of the edge lengths is minimum (among all spanning trees of M). Show:

- a) Every EMST of M contains a closest pair, i.e. an edge between two points $p, q \in M$, that have minimum distance to each other among all point pairs in $\binom{M}{2}$.
- b) Every Delaunay Triangulation of M contains an EMST of M .

Exercise 3 (10 points)

Consider a triangulation \mathcal{T} of a finite point set $P \subset \mathbb{R}^2$. Show that there is a point $p \in P$ which is incident with at most 5 edges in \mathcal{T} .