

Problem sheet 5

Problems will be discussed at the problem class on **November 30, 2016**.

Problem 10.

Determine the Helly number of family \mathcal{C} and property P in each of the following cases:

- \mathcal{C} is the family of arcs on a unit circle and P is “have a non-empty intersection”.
- \mathcal{C} is the family of all vertical segments in the plane \mathbb{R}^2 and P is “can be pierced by some straight line”.
- \mathcal{C} is the family of all closed convex sets in \mathbb{R}^2 and P is “the union fits between two parallel lines at distance 1”.

Problem 11.

Show that if $X \subseteq \mathbb{R}^2$ is a compact convex set and $p \in X$ is any point, then there exists a segment $s(p)$ such that

- p is contained in $s(p)$ and $s(p)$ is contained in X ,
- there are two parallel tangents of X , each containing one endpoint of $s(p)$.

Puzzle 5.

How many sliding moves are needed to bring the L-shape in the bottom-right corner?

