

Metric Geometry

Exercise Sheet 9

You can find information about the exercise class on our homepage. If you have problems with some of the exercises or search for further exercises, the script (especially Appendix A) might be helpful.

Exercise 1

Show that the map F constructed on p. 83 is 1-lipschitz.

Exercise 2

Let X be a geodesic space and $A \subset X$ closed such that $X \sqcup_A X$ is CAT(0). Show that A is convex in X .

Exercise 3

- a) We set $A := \{(x, y) \in \mathbb{R}^2 : x, y > 0\}$ and equip $X := \mathbb{R}^2 \setminus A$ with its induced length metric. Show that X and $X \sqcup_{\partial A} X$ are CAT(0).
- b) We set $A := \{(x, y, z) \in \mathbb{R}^3 : x, y, z > 0\}$ and equip $X := \mathbb{R}^3 \setminus A$ with its induced length metric. Show that X and $X \sqcup_{\partial A} X$ are not CAT(0).

(Hint: Show that ∂A is convex in X .)