# Discrete and Computational Geometry, WS1415
# Exercise Sheet "8": Properties Abstract Voronoi Diagrams
## University of Bonn, Department of Computer Science I

- *Written solutions have to be prepared until* **Tuesday 9nd of December 14:00 pm**. *There will be a letterbox in the LBH building.*
- *You may work in groups of at most two participants.*
- *Please contact Hilko Delonge, hilko.delonge@uni-bonn.de, if you want to participate and have not yet signed up for one of the exercise groups.*
- *If you are not yet subscribed to the mailing list, please do so at https://lists.iai.uni-bonn.de/mailman/listinfo.cgi/lc-dcgeom*

**Exercise 20: Line segments and Abstract Voronoi diagram (4 Points)**

Consider a set $S$ of $n$ disjoint line segments, and let $\mathcal{J}$ be the $\binom{n}{2}$ bisecting curves among $S$. Please prove the bisecting system $(S, \mathcal{J})$ is admissible, i.e., the corresponding Voronoi diagram is an abstract Voronoi diagram.

**Exercise 21: Karlsruhe metric (4 Points)**

The Karlsruhe metric, also known as the Moscow metric, is a distance measure in a radial city where there is a city center, and roads either circumvent the center or are extended from the center. The distance $d_K(p_1, p_2)$ between two points is $\min(r_1, r_2) \times \delta(p_1, p_2) + |r_1 - r_2|$ if $0 \leq \delta(p_1, p_2) \leq 2$ and $r_1 + r_2$, otherwise, where $(r_i, \psi_i)$ are the polar coordinates of $p_i$ with respect to the center, and $\delta(p_1, p_2) = \min(|\psi_1 - \psi_2|, 2\pi - |\psi_1 - \psi_2|)$ is the angular distance between the two points. Please prove the bisecting curve system in the Karlsruhe metric to be admissible.