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Global Differential Geometry
Exercise sheet 6

Exercise 1

(a) Show that d_L satisfies the triangle inequality.$^{\Psi}$

(b) Let X and Y be compact metric spaces. Show that $d_L(X,Y)=0$ if and only if X and Y are isometric.

Exercise 2

Let $(X_n)_{n\in\mathbb{N}}$ be a sequence of compact metric spaces that converges with regard to d_L to a compact metric space X. Show that it also converges to X with respect to the Gromov-Hausdorff topology.

Exercise 3

Some authors define a different Lipschitz distance

$$d_{L'}(X,Y)=\inf\left\{\ln(\max\{\operatorname{dil}(f),\operatorname{dil}(f^{-1})\}\,\middle|\,f:X\to Y \text{ is a bi-Lipschitz homeomorphism}\right\}.$$

Show that $d_{L'}$ is positive-semidefinite and satisfies (a) and (b) of exercise 1. Moreover show that $d_{L'}$ and d_L induce the same topology.

$^{\Psi}$ Seems to be quite difficult.

Due: Wednesday, 13.6.2012, during the exercise class