Surfaces and Automorphisms

Problem Set 10 H. Reich/F. Lenhardt
WS 2013/14

Exercise 1
Let A be a Riemann surface whose underlying topological surface is an open annulus. Calculate $\mathrm{Bihol}(A)$.

Exercise 2
Compute the canonical hyperbolic metric on the punctured disk $\mathbb{D} - \{0\}$.

Exercise 3
Give an example of a metric space X and an isometry g such that the infimum $\inf_{x \in X} d(x, gx)$ is positive, but the infimum is not achieved.

Exercise 4
For a function f on $\mathbb{R}$, we define $\tau_x f$ and $\check{f}$ via

$$(\tau_x f)(y) = f(y + x)$$
$$\check{f}(y) = f(-y)$$

For a distribution T and a test function ϕ define the function $T * \phi$ via

$$(T * \phi)(x) = T(\tau_x \check{\phi})$$

Let δ be the Dirac distribution and H the Heaviside function. Interpret and compute

$$1 * (\delta' * H)$$
$$(1 * \delta') * H$$