Comprehension questions

PROBLEM 37.1. *For hyperbolic geometry, check by explicit computation that* $x(t) = 0$, $y(t) = e^t$ *solves the geodesic equation.*

PROBLEM 37.2. *Take the geometry* $\psi(x, y) = -\ln(1+x^2+y^2)$. *Check that the circle* $(x(t), y(t)) = (\cos(t), \sin(t))$ *solves the geodesic equation. (In the next lecture, we'll learn some general statements that apply to this case; but for now, please do the computation from scratch.)*

PROBLEM 37.3. *Think of a geometry where the straight line segment from* $(0, 0)$ *to* $(1, 0)$ *is a geodesic, but is not the shortest path connecting those two points. You don't have to give any formulae, it's enough to sketch what the function* ψ *should look like.*

18.900 Geometry and Topology in the Plane
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