MATH372 Examples 25/08/17

Aside: $d\mu = \sqrt{\det g}$ - induced measure.

Now for Riemannian matrices this matrix has the property of being positive definite.

$$\det g = \frac{(1-y^2)(1-x^2) - x^2y^2}{(1-x^2-y^2)^2} = \frac{1-x^2-y^2}{(1-x^2-y^2)^2} = \frac{1}{(1-x^2-y^2)}$$

Christoffel Symbols
$\Gamma^k_{ij} = \dfrac{1}{2} g^{kl}(\partial_i g_{il} + \partial_j g_{ij} - \partial_l g_i j)$, $i, j, k = 1, 2$.

Now $\Gamma^k_{ij} = \Gamma^k_{ji}$, so there are $\Gamma^1_{11}, \Gamma^2_{11}, \Gamma^2_{22}, \Gamma^2_{22}, \Gamma^2_{12}, \Gamma^2_{12}$ and $\nabla_i X_j = \partial_i X_j + \Gamma_{ij} k X_k$
(and so on, the calculation is long)