$$(u, v) \rightarrow (r, \theta, \phi) = [1, u, v]$$

Unit Sphere Manifold:

$$g = \begin{bmatrix} 1 & 0 \\ 0 & \sin^{2}{(u)} \end{bmatrix}$$

$$a = a^{u} \boldsymbol{e}_{u} + a^{v} \boldsymbol{e}_{v}$$

$$f = f^{u} \boldsymbol{e}_{u} + f^{v} \boldsymbol{e}_{v}$$

$$\nabla = \boldsymbol{e}_{u} \frac{\partial}{\partial u} + \boldsymbol{e}_{v} \frac{1}{\sin^{2}{(u)}} \frac{\partial}{\partial v}$$

$$a\cdot\nabla = a^{u} \frac{\partial}{\partial u} + a^{v} \frac{\partial}{\partial v}$$

$$\left (a\cdot\nabla \right) \boldsymbol{e}_{u} = \frac{a^{v}}{\tan{(u)}} \boldsymbol{e}_{v}$$

$$\left (a\cdot\nabla \right) \boldsymbol{e}_{v} = - \frac{a^{v}}{2} \sin{(2 u)} \boldsymbol{e}_{u} + \frac{a^{u}}{\tan{(u)}} \boldsymbol{e}_{v}$$

$$\left (a\cdot\nabla \right) f = \left (a^{u} \partial_{u} f^{u} - \frac{a^{v} f^{v}}{2} \sin{(2 u)} + a^{v} \partial_{v} f^{u}\right) \boldsymbol{e}_{u} + \left (\frac{a^{u} f^{v}}{\tan{(u)}} + a^{u} \partial_{u} f^{v} + \frac{a^{v} f^{u}}{\tan{(u)}} + a^{v} \partial_{v} f^{v}\right) \boldsymbol{e}_{v}$$

$$\nabla f = \left (\frac{f^{u}}{\tan{(u)}} + \partial_{u} f^{u} + \partial_{v} f^{v}\right) + \left (\frac{2 f^{v}}{\tan{(u)}} + \partial_{u} f^{v} - \frac{\partial_{v} f^{u}}{\sin^{2}{(u)}}\right) \boldsymbol{e}_{u}\wedge \boldsymbol{e}_{v}$$

1-D Manifold On Unit Sphere:

$$\nabla = \boldsymbol{e}_{s} \frac{1}{\sin^{2}{(u^{s})} \left(\partial_{s} v^{s}\right)^{2} + \left(\partial_{s} u^{s}\right)^{2}} \frac{\partial}{\partial s}$$

$$\nabla g = \frac{\partial_{s} g}{\sin^{2}{(u^{s})} \left(\partial_{s} v^{s}\right)^{2} + \left(\partial_{s} u^{s}\right)^{2}} \boldsymbol{e}_{s}$$

$$\nabla \cdot \boldsymbol{h} = \frac{1}{\sin^{2}{(u^{s})} \left(\partial_{s} v^{s}\right)^{2} + \left(\partial_{s} u^{s}\right)^{2}} \left (\left(\sin^{2}{(u^{s})} \left(\partial_{s} v^{s}\right)^{2} + \left(\partial_{s} u^{s}\right)^{2}\right) \partial_{s} h^{s} + \left(\sin^{2}{(u^{s})}\partial_{s} v^{s}\partial^{2}_{s} v^{s} + \frac{\partial_{s} u^{s}}{2} \sin{(2 u^{s})} \left(\partial_{s} v^{s}\right)^{2} + \partial_{s} u^{s}\partial^{2}_{s} u^{s}\right) h^{s}\right)$$