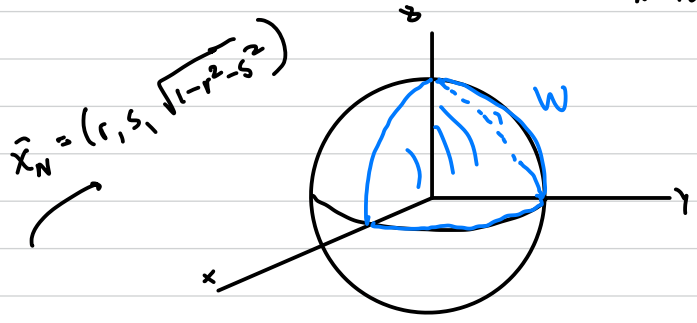
Ex S = sphere

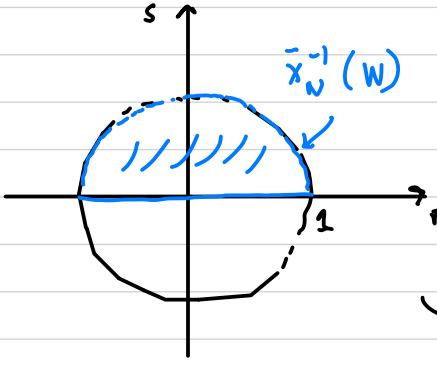
$x^2+y^2+z^2=1$

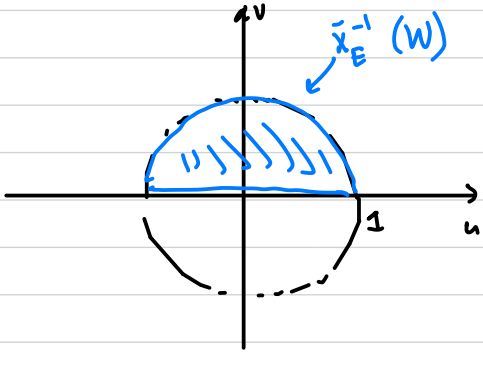


$\bar{x}_N = (r, s, \sqrt{1-r^2-s^2})$

$(u, \sqrt{1-u^2-v^2}, v)$

$\bar{x}_E$





$h = \bar{x}_E^{-1} \circ \bar{x}_N$

$$h(r,s) = \bar{x}_E^{-1} \circ \bar{x}_N(r,s)$$

$$= \bar{x}_E^{-1}\left(r, s, \sqrt{1-r^2-s^2}\right)$$

$$= \left(r, s, \sqrt{1-r^2-s^2}\right)$$

Thm says: this is diffble.

So $h(r,s) = \left(r, s, \sqrt{1-r^2-s^2}\right)$

$\rightarrow$ 2x2 matrix

$$\begin{bmatrix} 1 & 0 \\ \frac{-r}{\sqrt{1-r^2-s^2}} & \frac{-s}{\sqrt{1-r^2-s^2}} \end{bmatrix} = dh_{(r,s)}$$