

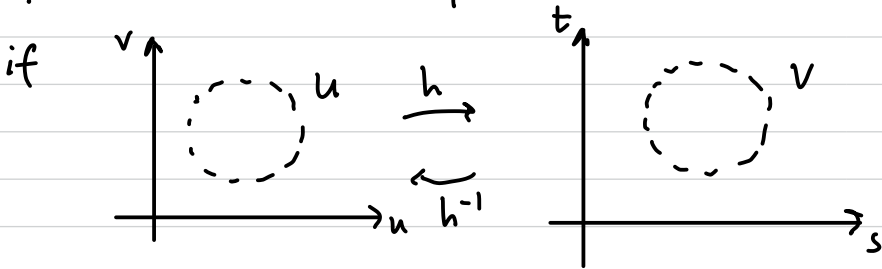
Change of Parameters

Overall goal: Do calculus and make measurements
on surfaces

Idea: Use coord charts to pull questions on S back to \mathbb{R}^2 .

Preliminary work: show that choice of chart won't affect
things.

Defn Sps $U, V \subset \mathbb{R}^n$. We say $h: U \rightarrow V$ is a diffeomorphism



1. h is 1-1 and onto
2. h is diffeable (ie. dh_p exists at all $\bar{p} \in U$)
3. h^{-1} is diffeable on V .

Note: homeomorphism vs. diffeomorphism vs. isometry

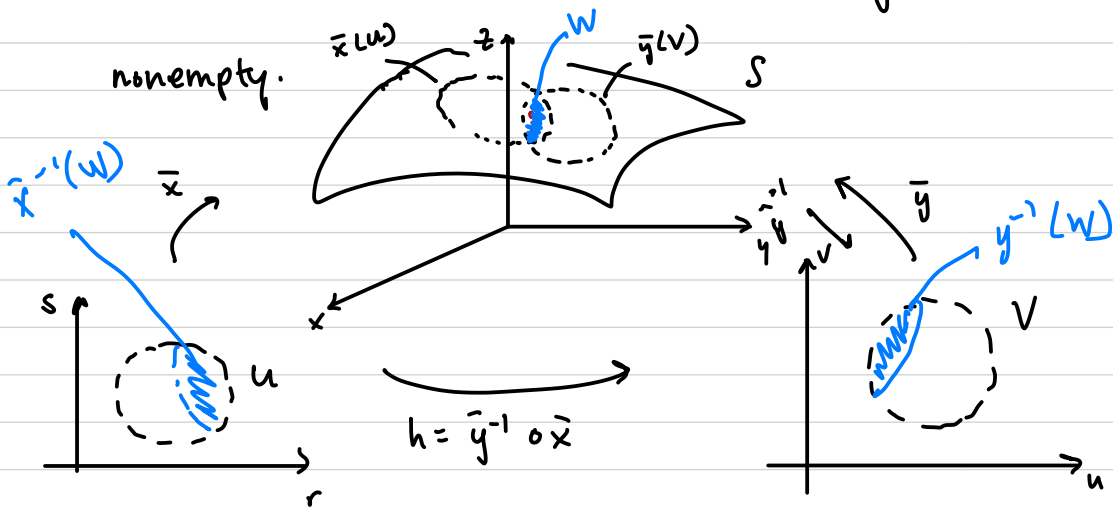
↳ u, v basically same from p.o.v. of differentiability.

Thm. (Change of parameters, a.k.a change of variables)

Sps S is a regular surface and (\bar{x}, u) and (\bar{y}, v)

are two charts such that $W = \bar{x}(U) \cap \bar{y}(V)$ is

nonempty.



Then the change of coordinates

$$h = \bar{y}^{-1} \circ \bar{x} : \bar{x}^{-1}(w) \rightarrow \bar{y}^{-1}(w)$$

is a diffeomorphism.