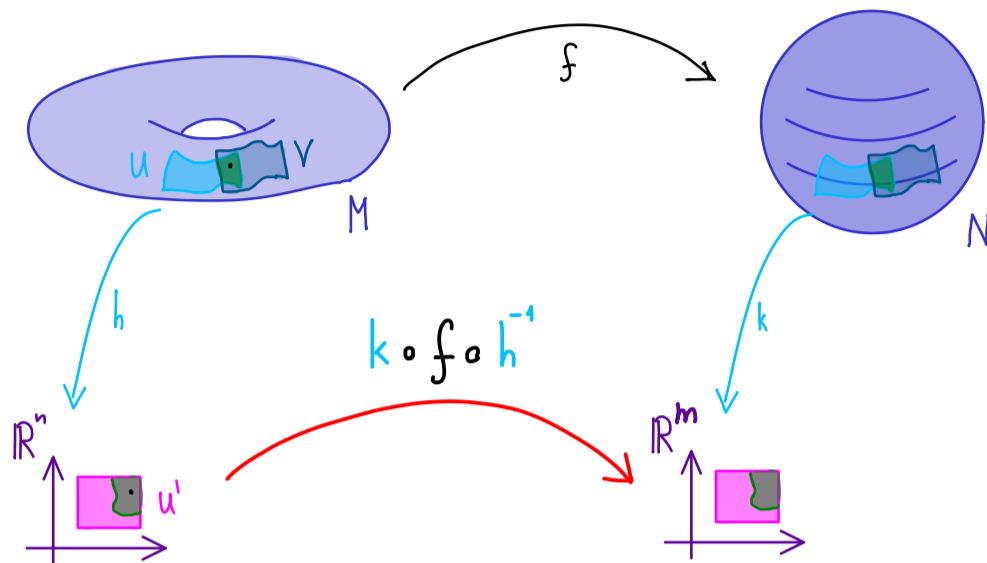


Manifolds - Part 17



$$f: M \rightarrow N$$

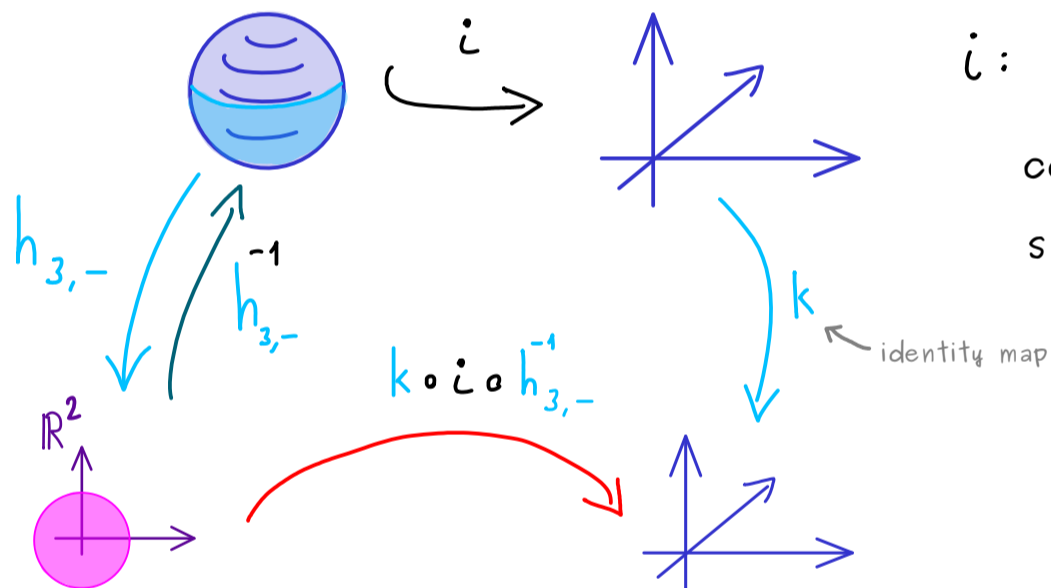
C^∞ -smooth

Examples of smooth maps:

(1) $S^2 \longrightarrow \mathbb{R}^3$

$$h_{3,-} \left(\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} \right) = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$$

$$h_{3,-}^{-1} \left(\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} \right) = \begin{pmatrix} x_1 \\ x_2 \\ -\sqrt{1 - \|x'\|^2} \end{pmatrix}$$



inclusion map:

$$i: X \mapsto X$$

continuous!
smooth?

$$k \circ i \circ h_{3,-}^{-1} : \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} \mapsto \begin{pmatrix} x_1 \\ x_2 \\ -\sqrt{1 - \|x'\|^2} \end{pmatrix} \text{ differentiable } \implies i \text{ is smooth}$$

(2) $q: S^2 \rightarrow P^2(\mathbb{R}) = S^2/\sim$ ($x \sim y \Leftrightarrow x = y$ or $x = -y$)
 $x \mapsto [x]_{\sim}$ continuous map! smooth?

