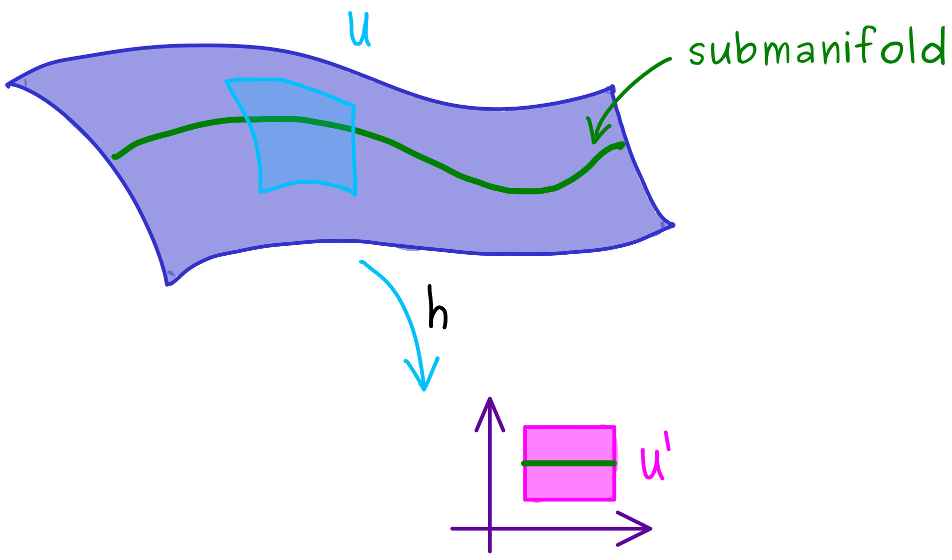
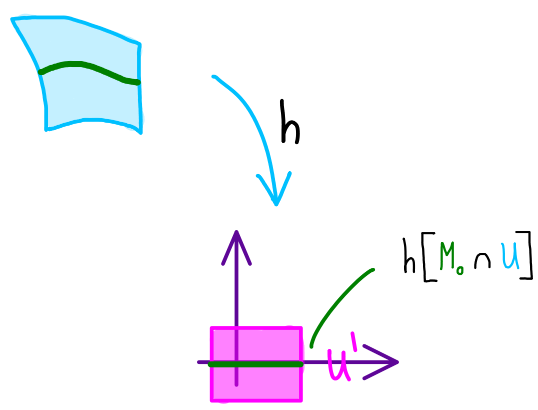
Manifolds – Part 14



Definition: Let M be an n-dimensional (smooth) manifold.
$M_0 \subseteq M$ is called a k-dimensional submanifold of M if

for all $p \in M_0$ there is a chart (U, h) of M with

$$h[M_0 \cap U] = (\mathbb{R}^k \times \underbrace{0}_{n-k \text{ zeros}}) \cap U'$$



(U, h) is called a submanifold chart for M_0.

Note: M_0 is also a manifold:

(U, h) submanifold chart $\rightsquigarrow$ $(\tilde{U}, \tilde{h})$ chart, $\tilde{U} := U \cap M_0$

$\tilde{h}$ given by $p \mapsto h(p) = \begin{pmatrix} * \\ \vdots \\ * \\ 0 \\ \vdots \\ 0 \end{pmatrix} \longmapsto \begin{pmatrix} * \\ \vdots \\ * \end{pmatrix} \in \mathbb{R}^k$