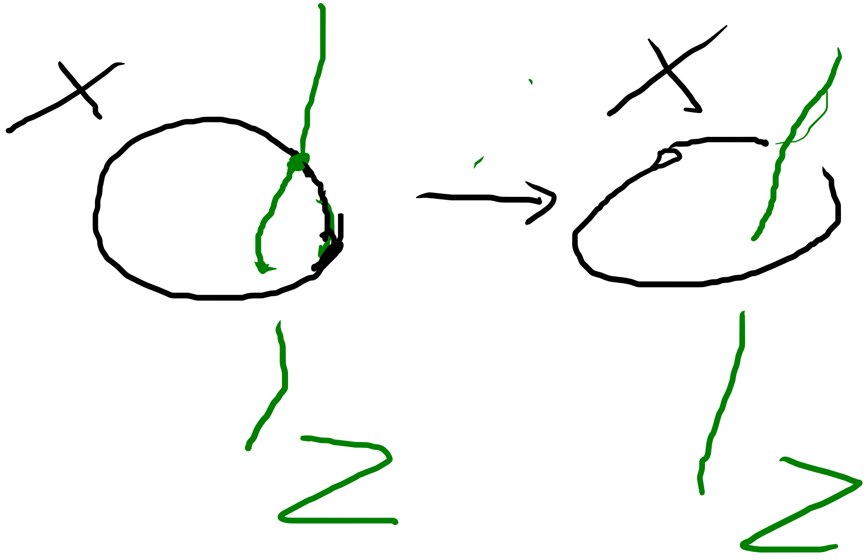
***5.** Suppose that the compact submanifold X in Y intersects another submanifold Z, but $\boxed{\dim X + \dim Z < \dim Y}$. Prove that X may be pulled away from Z by an arbitrarily small deformation: given $\epsilon > 0$ there exists a deformation $X_t = i_t(X)$ such that X_1 does not intersect Z and $|x - i_1(x)| < \epsilon$ for all $x \in X$. (*Note*: You need Exercise 11, Chapter 1, Section 6. The point here is to make X_t a manifold.)

$Y = \mathbb{R}^3$

$X \simeq Z \simeq \mathbb{R}$



$i: X \longrightarrow Y$ encaje

$I: X \times (-\varepsilon, \varepsilon) \longrightarrow Y$

$i_t = I(\cdot, t): X \longrightarrow Y$

Necesitamos: para casi todo $t \in (-\varepsilon, \varepsilon)$

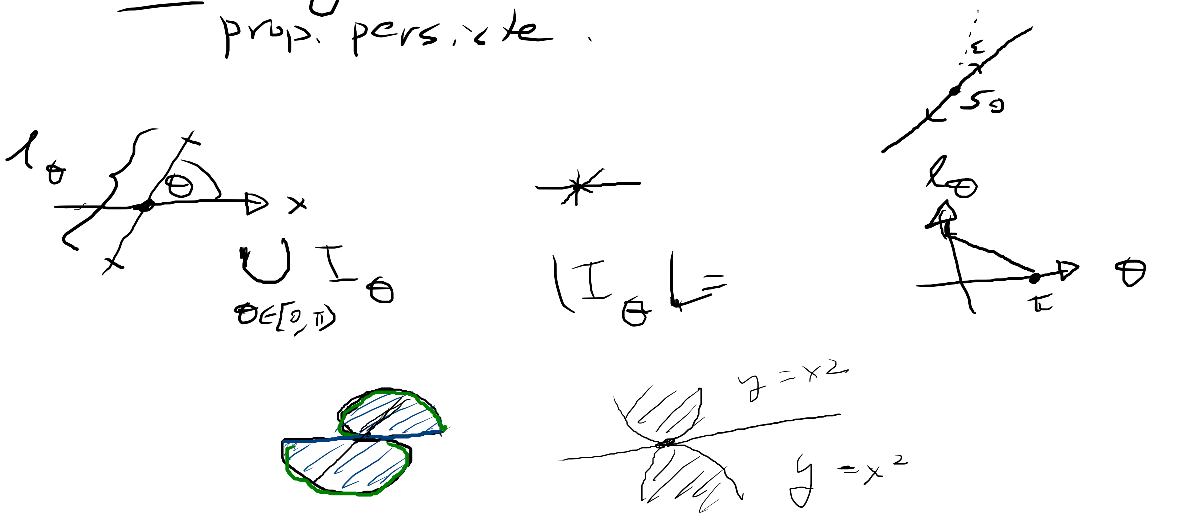
$i_t: X \longrightarrow Y$ es ① encaje ✓

② $\pitchfork Z$

Ej 1.6.11. $F: X \times S \to Y$ (S: ab. en $\mathbb{R}^n$), $s_0 \in S$

$F_{s_0} := F(\cdot, s_0)$ tiene una de las propiedades del teo. de estab. (transv., encaje, etc.)

P.D. hay una vec. de s_0 en S en donde la prop. persiste.



F_{s_i} no es un encaje

y $s_i \to s_0$

$\gamma: (-1,1) \to \mathbb{R}$

$S \subset \mathbb{R}^n$

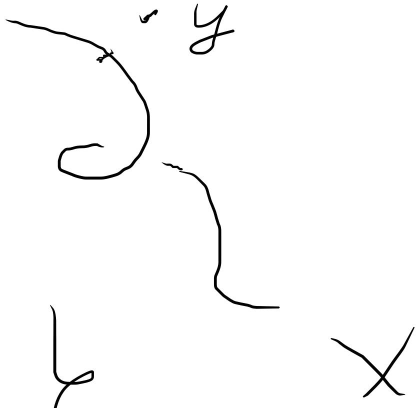
$\cup$

$s_0 \in S_0$

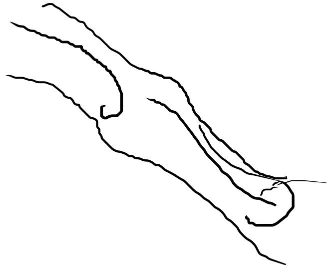
Cómo deformar una subvariedad $X \subset Y$?

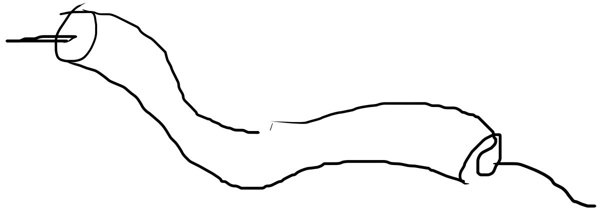
El teo. de ε-vecindad.

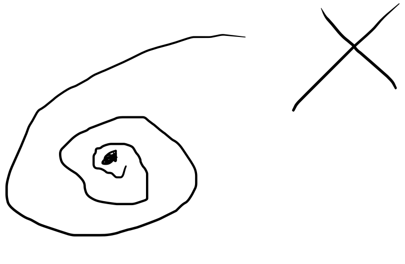
$$X_\varepsilon = \{ y \in Y \mid \text{dist}(y, X) < \varepsilon \}$$



$$\text{dist}(y, X) = \min \{ \text{dist}(y, x) \mid x \in X \}$$







ese NO

$$F(x, s) = \pi[f(x) + \epsilon(f(x))s].$$

Y comp. $\Rightarrow \varepsilon$ const.

$F = \pi(x + \varepsilon s)$

f = contención

$F(\cdot, s) : X \longrightarrow Y$.