\( Q = \infty \)

1. Is this part of the TQFT package?
   (Use for all fields, a hypothesis test)
   \( \text{products} \)

2. How does this relate to operations on \( S^4, H^\ast \)?

3. Knots in Jet bundles & \( S^4 \) vs. general manifold

   
   standard, stable finite, non-surjecting symplectomorphic?

   (Any base, like oriented knot structures).

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**Yasha:**

\[ T^2 \times S^2 \times C \]
\[ S^2 \times \mathbb{R}^4 \text{ boundary} \]
\[ S^2 \times S^2 \]

Remove on \( S^2 \), it is \( J^1(S^2) \)

Line submanifold path

unstable null for subcrit side = \( S^3 \times \mathbb{R}^3 \) here

\[ 2 \text{ dim } 0 \text{ dim } 1 \]

Then can cancel

Construct a leg, a fold, that can be made disjoint

**Conj:** All produce exotic \( \mathbb{R}^4 \)
can write down \( SL_\mathbb{R} \)

Different of points, non-coincidences

And something w/ vanishing \( SL_\mathbb{R} \)

Prove something stable under stabilization/undershoot
\[ J^1(M) = \left. \frac{\partial}{\partial s} \right|_{s=0} \left( \left. g_{s} \right|_{s=0} \right) \times \mathbb{R}^2, \]

\[ \text{Suppose we have} \quad F : M \times V \rightarrow \mathbb{R} \]
\[ F_\xi : V \rightarrow \mathbb{R} \quad g \in M. \]

\[ \begin{cases} p = \frac{\partial F_\xi}{\partial g} \\ \xi = F \quad \text{Cerf diagram} \\ \frac{\partial F}{\partial x} = 0 \end{cases} \]

at every \( p \), make cont. value.

get \( \text{Cerf's} \) projection, not \( \text{necessarily} \) embedded \( \log \).

IF \( F \) has at least 2 \( \text{crit. points} \), then this
\[ \text{intersects \( \sum_{\partial M} \text{crit. points} \)} \]
\( \text{less, permits under \( \log \), crit. part} \) (maybe stabilize that).

\[ V \rightarrow V \times \mathbb{R}^n \]
\[ F \rightarrow F + \xi(F) \]
\( \text{non-deg. good form} \)

"Stable Morse theory"

Examples:

- \( \mathbb{M} = S^2 \)
- \( V = S^1 \)

Do this over \( S^2 \).
High dimension, need $\nabla \Delta f = 2$.

Take $V$ non-compact.

Add one section (over $S^2$), but over $S^3$ here, want something to not be knotted topologically.

Lemma: $T^2(S^2)$

$S^2 \subset \mathbb{R}^3 \subset \mathbb{C}^3$

$U(S^2) \subset \mathbb{C}^3.$

$S^2 \times S^1 \subset \mathbb{R}^3 \twoheadleftarrow \mathbb{C} \cup (S^2)$

Claim: Remove any leg, re-implant or knot into $\Sigma(S^2)$

and $S^2 \neq 0$ section.

Need to prove it's not leg, isotopic to $S^2 \times S^3$.

non-trivial Floer homology.

Take $S^2 \times S^2$, do connected sum.

In high dimension, makes sense.

Can try to write down $\Sigma$, computer cannot stabilize by growing fan.

Do something more clever.

Do a way that kills $S^2$, intersect fiber @ 3 points.