\[ T_{\text{Avbgs}} 2 \quad \text{and} \quad a > 0 \]
\[ M \equiv a \to 0 \]
\[ \text{Choose metric: } k l = 1, \text{ such that } a = 2a \]
\[ F \circ U(2) \quad S = F \times U(2) \quad e^2 \]
\[ F_r \circ SO(3) \quad S = E \otimes E K^{-1} \]
\[ \zeta(E) = PD(\mathbb{R}) \]
\[ \text{Class that \quad steady} \]
\[ \text{in Eor.} \]
\[ \Gamma(x, y) \in C^\infty(S^5) \]
\[ * F_A = r(y + t y - i a) - \frac{i}{2} \pi C \kappa \]
\[ D_A y = 0 \]
\[ |\lambda| \leq 1 + c_o / r \]
\[ |\beta| \leq c_0 / \sqrt{r} \]
\[ |\alpha| \leq c_0 / \sqrt{r} \]
\[ |\beta| \leq c_o \]
\[ \lambda \alpha \leq c_0 / \sqrt{r} \]
\[ \lambda \beta \leq c_0 \]
\[ \| A \| \leq c_0 / \sqrt{r} \]
\[ |\lambda \beta| \leq c_0 \]
\[ E(A) = \int_{\lambda \beta} g \wedge F_A \]
\[ |a \wedge F_A| = r(1 - |\lambda \beta|^2) + O(1) \quad \text{as } \quad a \to 0 \]
\[ \lambda \beta \leq 1 - |\lambda \beta|^2 \quad + \quad O(1) \]

Following obstruction, choose a pt. where \( |\lambda \beta| < 1 - \delta \).

Then \( \exists \) where \( \lambda \beta \to 0 \) as \( \delta \to 0 \).

\[ \delta^2 \quad \text{so contribution} \quad \int a \wedge F_A \]
\[ T_{\delta(0)} \geq \frac{1}{2} \delta^4 \]
This is in common case. In particular, if number \( N \) of these cylinders
is \( N \geq \theta(\varepsilon/\delta)^{1/2}, \) too many!
so if we can show these cylinders persist especially on a Reeb orbit, it must be closed/finite length.

Use degree theory: \( A = A_{\perp} \frac{1}{2\epsilon} \chi(1\pm 1) \left( \frac{x}{\lambda} \frac{D_{\lambda}}{\lambda} - \frac{D_{\lambda}}{A_{\perp}} \right) \)

\[ \hat{A} \text{ is finite} \]

where \( \Delta \min \geq 1 - \delta/\epsilon \)

\[ \beta \]

For \( \min \geq \frac{\delta}{\epsilon} \): \( F_{\alpha} = (1 - \varepsilon) F_{\perp} + \varepsilon \hat{A}_{\perp} \alpha \) or \( \varepsilon \) \( \alpha = \hat{A}_{\perp} \) constant, \( \alpha \) for needs to limit to a Reeb orbit.

Now how to go back from Reeb orbit to \( \alpha, \beta \)?

\[ \partial_x \chi = i \partial^1 \alpha + (\partial_1 \chi - i \partial_2 \beta) \]

\[ \partial_y \chi = -i \partial_2 \beta + i (\partial_1 \alpha + i \partial_2 \alpha) \]

\( \text{such that} \)

\( \text{put here} \)
As, FA looks like $-kP$, no suggest an orthogonal plane to $P$ leads orbit.

Salient features reduce to $C \sim P$ leads

\[
\begin{align*}
\text{resulting by } & \frac{1}{r}, \\
& \text{use equations} \\
& \text{get something close to:}
\end{align*}
\]

Let $C = \text{moduli space of solutions}$

\[C^0(C; S')\]

\[\sigma_C = \begin{cases} 
\infty & m = 0 \\
\frac{1}{m} & m > 0 
\end{cases}\]

\[\int (1-|\alpha|^2) = 2\pi m \quad \text{on } C_m\]

\[|\alpha| = 1 \quad \text{or} \quad |\alpha| < 1\]

- $C_m$ has a natural complex structure $\cong \mathbb{C}^m$
- Coordinates $\sigma_C = \frac{1}{2\pi} \int_C z^2 (1-|z|^2)$
- $|z| < 1$ for $z \in C_m$

- Also, $C_m$ has a natural $z^2$ over $C_m$ (Kaehler structure, not coming from above) of $\alpha$. 
where here: $\mathcal{E} = \{ \mathcal{E}_m \} \subset \mathcal{L}^2(\mathbb{R}^2)$

$\mathcal{P}_0 = \int |x|^2 + |\psi|^2$ (for behavior structure)

$\frac{\partial \psi + \frac{1}{i} \mathcal{A}_0}{\partial \mathcal{A}_0} \mathcal{P}_0 = 0$?

So now, work backwards:

$\mathcal{E}_m = \{ (\gamma, \nu): \gamma \text{ Reeb orbit}, \nu \}

\mathcal{E} = \mathcal{E}' \mapsto \mathcal{E}_m$

chain parameters: (const speed) by $\mathbb{R}/2\pi\mathbb{Z}$;

choose fancy param for normal role,

$x$ by chosen tubular around $T_x M$.

Line bundle: $E \simeq V_0 \times \mathcal{E}_0$, $V_0 = M \setminus \{ x \}$, $T_x M$

$A \times \mathbb{R}$ product connection, $(1, 0)$.

$E_{T_x M} = T_x M \times \mathcal{E}_0$

$\alpha^{t, r} (x, y) = \alpha^t (\sqrt{s-r} x, \sqrt{s-r} y)$

$F^{\text{prod}} = (A^t_{\mathcal{E}_m}, (\alpha^{t, r} \circ 0))$. Biz of exponential decay, can use cutoff func to smooth.

How close did we get to solving $\mathcal{S}_0$?

Look at $\frac{1}{\mathcal{E}_0} \left| \star F_{A^t} \psi + h (\frac{1}{2} x - \chi \psi_i) \right| + \left| \partial_{A^t} \psi \right| = O(1)$ (this is $\delta (\sqrt{s})$, if call this $(A_{\text{approx}}, \psi_{\text{approx}})$, try to

find a perturbation $(A, \psi)$ that gives a real soln — ran it...
$\Theta(t)$ is simply too big! (off-diagonal term...) This is because we just chose any smooth map $f(t)$.

Need to control derivative of map $g(t)$:

\[ g(t) = 1 + \eta t + \nu t^2 + o(t^2), \]

where $\eta : S \to \mathbb{R}$, $\nu : S \to \mathbb{C}$

defines deformation theory of Reeb $\alpha$.

Self-adjoint

What to take deg. form in moduli space

\[ h = \frac{1}{2\pi} \int (2\nu(t) |x|^2 + \nu \bar{x}^2 + \bar{\nu} x^2)(1-|x|^2) \]

treat it as a Hamiltonian.

\[ \frac{dV}{dt} + \omega^{-1}(dh) = 0. \quad (\forall t) \]

Need $x$ to be a closed orbit of this Hamiltonian, gets us to $\Theta(\sqrt{\nu})$.

So gluing data we need to go backwards is the following:

\[ \Theta = \mathcal{F}(x, m) \quad \exists \text{ Reeb orbit} \]

\[ \Sigma \text{un} x = \text{PD}(c_1(E)) \]

for each $(x, m)$ a choice of non-degenerate gluing data fixes a big closed orbit of $\omega^{-1}(dh, \cdot)$

Fix $L > 0$

\[ X_t = \text{dist}(x_t, \text{dist}(x_t, \cdot)) \quad \text{if we choose } L(\Theta) < L \quad \text{and space of solutions} \]

Then: $\exists$ injective $\Phi : X^t \to M$ if $r > 1$. 

\[ v = \text{const} = R/2 \quad m = 0 \]

For each \( m \), if a unique solution, symmetric vertex,
\[ x^{-1}(0) = 0, \quad \text{(Elliptic)} \]

Hyperbolic unique solution \( m = 0 \), \( x^{-1}(0) = 0 \)

\[ y = \frac{y}{t} \quad m = i e^{ik} \]

\[ \text{uniquely defined contact structure} \]

Proof: \( L > 0, \quad R^L = \text{Reeb orbit} \quad L \leq L \).

Then \( \exists (q, _J^L) \in \text{conj } s.t.: \)
\[ \cdot q_0, \quad J_0 = (0, J) \]
\[ \cdot (a_1, J_1) \text{ has: } \]

(1) \( \forall \ell, \text{Reeb orbit } L \leq L \) are identical.

(2) \( 1-1 \text{ correspondence between \( \ell \)-hol curves that } \]

\( \text{connect } L \leq L \) \( \text{Reeb orbits} \).

(3) \( (a_1, J_1) \text{ near } \psi \) \( \text{Reeb orbit has canonical form} \).

S decreases the length of \( \text{Emb} L \).

\[ \text{Each } = e^L \rightarrow e^L \rightarrow e^L \rightarrow \text{Length} \]

\[ u \rightarrow \text{direct limit} \rightarrow \text{length fillins} \]

\( \text{this is not even } C^1 \) changing \( R^L \) \( \text{direct limit} \rightarrow \text{length fillins} \)

\[ R^L \rightarrow R \times \mathbb{C} \]

1-Jet.\[ \text{I.D.} \]
Upshot is, $x(t)$ is $L$, $k=1$,

$$
\mathfrak{F} = \text{Tech, measures of }
$$

\text{all geodesics.}

$$
\text{(Length, } L, m = 1 \text{ of } \mathfrak{F} \text{ hyperbolical.)}
$$

\text{Identify I = 1 phol. curves w/}

\text{index 1 instantons in SW.}

\text{What if we didn't perturb } (a, J) ?:

\text{Some technical issues...}

\text{same geometry of SW.}

\text{compute Floer homology on } \mathfrak{F} \text{.}

\text{of Hamiltonian.}

\text{elliptic } Z \text{ in all } m > 1

\text{hyperbolic } Z \text{ if } m = 1, 0 \text{ if } m > 1.

\text{So non-fold by length, } E_2 \text{ term.}

\text{The Floer homology}

\text{small differential}.

$$
\text{tech, } \text{of } \text{tech.}
$$

$$
E_2 \text{ term: } Z \text{ if } (a, J) \text{ tech, } 0 \text{ if } (a, J) \text{ tech.}
$$