diffeomorphic, i.e $\varphi_t : \pi^{-1}(\gamma(t)) \longrightarrow \pi^{-1}(\gamma(0)) = S_0$ has an inverse φ_{-t}, since if $p \in \phi^{-1}(0)$, then $\phi(\varphi_{-t}(p)) = t + \phi(p) = t$. ⫝̸

On Bertini's theorem

$W = |\langle \sigma_1, \sigma_2, \sigma_3 \rangle|$ a linear system. on M compact.

$\{\sigma_1 = 0\} = B_1$, $\{\sigma_2 = 0\} = B_2$, $\{\sigma_3 = 0\} = B_3$.

$\Rightarrow$ By the proof for a pencil, $\exists$ open dense subset U_1 in $\mathbb{C}^2$ s.t, for $\forall (a_1, a_2) \in U_1$,

$$a_1\sigma_1 + a_2\sigma_2 = 0 \quad \text{is smooth on } M - (B_1 \cap B_2).$$

Similarly, $\exists$ open dence subset U_2 in $\mathbb{C}^2$ s.t, for $\forall (b_1, b_2) \in U_2$

$$b_1\sigma_2 + b_2\sigma_3 = 0 \quad \text{is smooth on } M - (B_2 \cap B_3).$$

$\Rightarrow$ $U_1 \cap U_2$ is open and dense in $\mathbb{C}^2$.

For $\forall x \in M - (B_1 \cap B_2 \cap B_3)$, $\exists$ (a_1, a_2) s.t

$(a_1\sigma_1 + a_2\sigma_2)(x) \neq 0$ or $(a_1\sigma_2 + a_2\sigma_3)(x) \neq 0$.

Say $a_1\sigma_1 + a_2\sigma_2 \neq 0$ at x. $\Rightarrow \exists$ open set $U \ni x$ s.t $a_1\sigma_1 + a_2\sigma_2 \neq 0$ on U.

Let $f = a_1\sigma_1 + a_2\sigma_2$, $g = a_1\sigma_2 + a_2\sigma_3$.

$\Rightarrow$ Consider $(f + \lambda g = 0)$.

$\Rightarrow$ $\exists$ $\lambda \in \mathbb{C}$ s.t $f + \lambda g = 0$ is nonsingular by the proof for a pencil.

$\Rightarrow$ $a_1\sigma_1 + (a_2 + \lambda a_1)\sigma_2 + \lambda a_2 \sigma_3 = 0$ is nonsingular.

Let V be the subset of W which consists of singular zero locuses.