NO.
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We expect $\{f_i = \epsilon\}$ to be intersected each other transversely, at generic points. See, P650, the statement that Later we shall see that the Jacobian is not identically zero.

$\Gamma_0 = \{z : |f_1(z)| \leq \epsilon, \dots |f_n(z)| \leq \epsilon\} \simeq S^{2n-1}$ ... ⊛

For example $n=2$

$\{f_1 = 0\} \cap \{f_2 = 0\} = \{0\}$ in U.

Let $g_2(z_1, z_2) = f_2(z_1 - \epsilon_1^{(t)}, z_2 - \epsilon_2^{(t)})$, $\epsilon_1, \epsilon_2 \in \mathbb{C}$.

As we saw on P62, we have $\delta \geq t > 0$, s.t

$\{g_2(z_1, z_2) = 0\}$ intersects with $\{f_1 = 0\}$ transversely.

Still not clear.

Maybe ⊛ is assumed for sufficiently small ϵ. ⇒ Nonsense

If $n=1$, by Weierstrass preparation theorem, $\Gamma_0 \cong S^1$.

Let's forget it for a while. ⌋

Case 3: f, g and A arbitrary.

Now we let $A_t(z)$ be a continuous family of holomorphic matrices with $A_0(z) = A(z)$ and $\det A_t(0) \neq 0$ for $t \neq 0$.

⌜ Consider $\det(tI + A(0)) = \bar{f}(t)$

$\Rightarrow \bar{f}(0) = 0 \quad \Rightarrow \exists \ \epsilon > 0$ s.t $\bar{f}(t) \neq 0$ for $|t| < \epsilon$,

since $\bar{f}(t) = 0$ has at most n real roots. ⌋

Set $g_t = A_t \cdot f$, and observe that since $g^{-1}(0) = \{0\}$, $g_t^{-1}(0) = \{P_t\}$ is an isolated set of points interior to U.

⌜ As we saw on P657, $g_t^{-1}(0) = \{P_t\}$ is an isolated set

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