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$\overline{U}$ of U. Since we are interested in the local theory around the origin, we shall allow ourselves to decrease the radius ε as necessary. We assume that the $f_i(z)$ have the origin as isolated common zero, or equivalently that set-theoretically $f^{-1}(0) = \{0\}$, where $f = (f_1, \cdots f_n)$. We set

$$\begin{aligned}
D_i &= (f_i) = \text{divisor of } f_i \\
D &= D_1 + D_2 + \cdots + D_n, \\
U_i &= U - D_i, \\
U^* &= U - \{0\} = \bigcup_{i=1}^{\infty} U_i .
\end{aligned}$$

Pf Set-theoretically $f^{-1}(0) = \{0\}$ is truce since we chose ε small enough, ($\because$ 0 is an isolated common zero). $\Downarrow$

Note that $\underline{U} = \{U_i\}$ gives an open cover of the punctured ball U^*.

We shall be interested in residues associated to a meromorphic n-form

$$\omega = \frac{g(z)\, dz_1 \wedge \cdots \wedge dz_n}{f_1(z) \cdots f_n(z)} \qquad (g \in \mathcal{O}(\overline{U}))$$

having polar divisor D. The residue is a variant of the Cauchy integral in several variables, and is defined as follows: Let Γ be the real n-cycle defined by

$$\Gamma = \{ z : |f_i(z)| = \varepsilon_i \}$$

and oriented by

$$d(\arg f_1) \wedge \cdots \wedge d(\arg f_n) \geq 0.$$

JONG IE WAH YUN PILL