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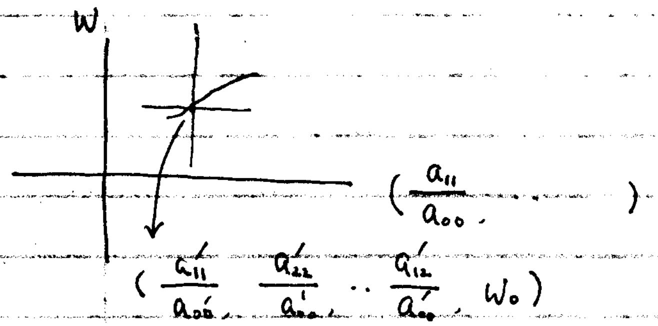
Assume $a_{00} \neq 0$ & consider $\frac{1}{a_{00}} f(a_{00}, a_{11}, \ldots \omega) = h(a_{11}/a_{00}, \ldots a_{12}/a_{00}, \omega) = 0$.

$\Rightarrow h(a'_{11}/a'_{00}, \ldots a'_{12}/a'_{00}, \omega_0) = 0 \Rightarrow$ By the Weierstrass Preparation Theorem, $\exists$ open set $U \ni (a'_{11}/a'_{00}, \ldots a'_{12}/a'_{00})$ s.t $\{(a_{11}/a_{00}, \ldots a_{12}/a_{00}, \omega) ; h(a_{11}/a_{00}, \ldots \omega) = 0 \quad (a_{11}/a_{00}, \ldots a_{12}/a_{00}) \in U\} \longrightarrow U$ is a finite-sheeted cover branched over the zero locus of an analytic function of $(a_{11}/a_{00}, \ldots a_{12}/a_{00})$.

If $(a_{11}/a_{00}, \ldots a_{12}/a_{00})$ satisfies this analytic function, then $a_{00}X_0^2 + a_{11}X_1^2 + \cdots = 0$ is tangent to C near ω_0, i.e. $[1, \omega_0, g(\omega_0)]$.

More precisely, by the Weierstrass Preparation Theorem, $\exists$ open set $U \times W$ s.t $U \ni (a'_{11}/a'_{00}, \ldots a'_{12}/a'_{00})$, $\omega_0 \in W$.



$$\{(a_{11}/a_{00}, \ldots \omega) ; h(a_{11}/a_{00}, \ldots \omega) = 0, \ (a_{11}/a_{00}, \ldots) \in U\}$$
$$\downarrow$$
$$U$$

is a finite-sheeted cover branched over the zero locus of an analytic function of $(a_{11}/a_{00}, \ldots a_{12}/a_{00})$.