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Moreover, to any function $g \in {}_v\mathcal{O}_v$ there corresponds a unique polynomial $Q_{f,g}(X) \in {}_n\mathcal{O}_W[X] \subseteq {}_v\mathcal{O}_v[X]$ of degree $\nu-1$ s.t $d_f \cdot g = Q_{f,g}(f)$ in ${}_v\mathcal{O}_v$.

Def: A holomorphic function $f \in {}_v\mathcal{O}_v$ is said to seperate the sheets of a finite branched holomorphic covering $\pi: V \to W$ with a regular part $\pi|V_0 : V_0 \to W_0$ provided that for each connected component of W_0 there is a point B in that component s.t if $\pi^{-1}(B) = \{A_1, \cdots A_\nu\}$ where A_j are distinct points, then $f(A_i) \neq f(A_k)$ whenever $i \neq k$.

Proof. Suppose $P(X) \in \pi^*({}_n\mathcal{O}_W)[X]$ s.t $P(f)=0$, $\deg P = \nu$
$\Rightarrow$ $P(f(A_j(z))) = 0$ $\Rightarrow$ $P(X)=0$ has ν distinct roots.
$\Rightarrow$ $P(X) = P_f(X)$ on an open set $\subset W$ $\Rightarrow$ Since P & P_f have holomorphic coefficients, $P = P_f$ on W.

With the same notation as in the proof of Theorem 5, the discriminant of the polynomial $P_f(X)$ is the function

$$d_f(z) = \Big(\prod_{j>k} [\, f(A_j(z)) - f(A_k(z)) \,] \Big)^2$$

and is a well-defined complex-valued function on W. Since $d_f(z)$ is evidently a symmetric polynomial in the values $f(A_j(z))$, it is necessarily a polynomial in the elementary symmetric functions of the values $f(A_j(z))$, the coefficients of the polynomial $P_f(X)$, and hence is actually a holomorphic function on W; and if B is a point of W for which $A_j(B)$ are distinct points and $f(A_j(B)) \neq f(A_k(B))$, $j \neq k$,