The combined collection

$$\left(\Delta_*\left(\frac{\partial}{\partial x_1}\right), \cdots \Delta_*\left(\frac{\partial}{\partial x_n}\right), \tilde{f}_*\left(\frac{\partial}{\partial x_1}\right), \cdots \tilde{f}_*\left(\frac{\partial}{\partial x_n}\right) \right)$$

is consequently obtained from the standard oriented basis $(\partial/\partial y_1, \cdots \partial/\partial y_n, \partial/\partial z_1, \cdots \partial/\partial z_n)$ for $T_{(p,p)}(M\times M)$ by the matrix

$$\begin{pmatrix} I_n, & I_n \\ I_n, & J_f(p) \end{pmatrix};$$

Γ $\left(\Delta_*\left(\frac{\partial}{\partial x_1}\right), \cdots \Delta_*\left(\frac{\partial}{\partial x_n}\right), \tilde{f}_*\left(\frac{\partial}{\partial x_1}\right), \cdots \tilde{f}_*\left(\frac{\partial}{\partial x_n}\right) \right)$

$$= \left(\frac{\partial}{\partial y_1} + \frac{\partial}{\partial z_1}, \cdots, \frac{\partial}{\partial y_n} + \frac{\partial}{\partial z_n}, \frac{\partial}{\partial y_1} + \sum \frac{\partial f_i}{\partial x_1}\cdot\frac{\partial}{\partial z_i}, \cdots \frac{\partial}{\partial y_n} + \sum \frac{\partial f_i}{\partial x_n}\frac{\partial}{\partial z_i} \right)$$

$$= \begin{pmatrix} I_n, & I_n \\ I_n, & J_f(p) \end{pmatrix} \begin{pmatrix} \frac{\partial}{\partial y_1} \\ \vdots \\ \frac{\partial}{\partial z_1} \\ \vdots \end{pmatrix}$$

we see accordingly that the cycles Γ_f and Δ intersect transversely at (p,p) exactly when

$$\det\begin{pmatrix} I, & I \\ I, & J_f(p) \end{pmatrix} = \det(J_f(p) - I)$$

is nonzero, i.e., when p is nondegenerate fixed point of f; and in this case the index of f at p is just the intersection number of Δ with Γ_f at p. Thus if f has only nondegenerate fixed points

$$\sum_{f(p)=p} \iota_f(p) = \#(\Delta\cdot\Gamma_f)_{M\times M},$$