assumption. $\Rightarrow$ $m_{(p,p)}(Z\times W,\ \Delta) = m_p(Z, W)$ by the formal properties of Künneth formula again ?, which we had better make clearer.

$\Rightarrow$ Thus $Z\cdot W = \sum_p m_p(Z, W)$.

So the key points are $m_{(p,p)}(Z\times W,\ \Delta) = m_p(Z, W)$, and $Z\cdot W = (Z\times W)\cdot\Delta$.

$Z\cdot W = [Z]\cdot[W] = [Z\times W]\cdot[\Delta]$ by P59 since $(-1)^{2n-2p} = 1$, where $[Z]$ & $[W]$ are homology classes represented by Z & W respectively.

Now it remains to show that

$$m_{(p,p)}(Z\times W,\ \Delta) = m_p(Z, W).$$

To show this, let's return to the definition of the intersection multiplicity m. P62.

Let V and W be two analytic varieties of dimension k and $n-k$ in the polycylinder Δ of radius 1 in $\mathbb{C}^n$ having the origin as their only point of intersection. Consider in the product $\Delta'\times\Delta'$ of the polycylinder of radius $\frac{1}{2}$ with itself the two varieties

$$\tilde{V} = \pi_1^{-1}(V) = \{(z, w) ;\ z\in V\} \quad \text{and}$$
$$\tilde{W} = \{(z, w) ;\ z-w \in W\}.$$

For each ϵ, of course, the varieties $\tilde{V}$ and $\tilde{W}$ meet the fiber $\pi_2^{-1}(\epsilon) = \Delta'\times\{\epsilon\} \cong \Delta'$ in the analytic variety V