$\gamma = 0 \Rightarrow C_0 = n-k$. formally. $\Rightarrow$ If $a_i + b_{k-i} \geq n-k+1$, for some i, then $a_i + b_{k-i} + C_0 \geq n-k+1 + n-k = 2(n-k)+1$.

$\alpha = i \quad \beta = k-i \quad \gamma = 0 \Rightarrow \alpha+\beta+\gamma = k$.

Now we have to prove that

$$\#(\sigma_a \cdot \sigma_b \cdot \sigma_c) = \#(\sigma_{a_1-1, \ldots a_i-1, a_{i+1}, \ldots a_k} \cdot \sigma_{b_1-1, b_2-1, \ldots b_{k-i}-1, b_{k-i+1} \ldots b_k} \cdot \sigma_c)_{G(k-1,n)}.$$

Start with $\#(\sigma_a \cdot \sigma_b \cdot \sigma_c)$.

$$\#(\sigma_a \cdot \sigma_b \cdot \sigma_c)_{G(k,n)} = \#(\sigma_{a^*} \cdot \sigma_{b^*} \cdot \sigma_{c^*})_{G(n-k,n)}$$

$$= \#(\sigma_{a^* - a^*_{a_i}} \cdot \sigma_{b^* - b^*_{b_{k-i}}} \cdot \sigma_{c^* - c^*_{c_0}})_{G(n-k-1,n-1)} \quad \text{if} \quad a^*_{a_i} + b^*_{b_{k-i}} = i+k-i = k = n-(n-k)$$

$$= \#(\sigma_{a_1-1, \ldots a_i-1, a_{i+1}, \ldots a_k} \cdot \sigma_{b_1-1, \ldots b_{k-i}-1, b_{k-i+1}, \ldots b_k} \cdot \sigma_{c_1, c_2 \ldots c_k})_{G(k-1,n)}$$

since $c^*_0 = 0$.

I am going to prove the previous note, i.e. Reduction Formula I is valid for $\beta = \gamma = k$, $a_1 = n-k$, and $\gamma = k$, $a_i + b_{k+1-i} = n-k$ for any i.

Obviously, they are valid, since the conditions above satisfy the requirement of Reduction Formula I. See p521 note. $\square$

Note also that if the sequence $b_1 - 1, \cdots b_{\beta-1}, b_{\beta+1}, \cdots$ appearing in the formula is no longer nonincreasing — i.e., if $b_\beta = b_{\beta+1}$ — then the intersection number is zero: just apply the formula to $\alpha, \beta+1, \gamma$.