single deference

The number of alpha and beta strings in both determines must be the same number if the tot spin of the system = zero. what that means is $\delta_{[m][p]}$ and $\delta_{[n][n]}$ must be one. for $\delta_{[m][n]}$ and $\delta_{[n][p]}$, there will be 2 other orbs in spinIntersection with same spin as m,p and 5 total orbs in spinIntersection, so $\delta_{[m][n]}$ and $\delta_{[n][p]}$ each equal 2/5.

1 one e

$$\langle\Psi|H_0|\Psi(k\to k')\rangle = h^{\alpha\beta}\,(-1)^{\varepsilon\left(\kappa_1,\ldots,\kappa_i',\ldots,\kappa_j,\ldots,\kappa_n\right)}\,\langle 0|\left(\prod_{\kappa=(\kappa_n\ldots\kappa_2)} a_\kappa\right) a_1 a_\alpha^\dagger a_\beta a_{\kappa_{1'}}^\dagger \left(\prod_{\kappa'=(\kappa_2\ldots\kappa_n)} a_{\kappa'}^\dagger\right)|0\rangle \tag{1}$$

$$= (-1)^{\varepsilon\left(\kappa_1,\ldots,\kappa_i',\ldots,\kappa_n\right)}\,h^{11'} \tag{2}$$

$$= (-1)^{\varepsilon\left(\kappa_1,\ldots,\kappa_i',\ldots,\kappa_n\right)}\,h^{(1)(1')}\delta_{[1][1']} \tag{3}$$

$$= (-1)^{\varepsilon\left(\kappa_1,\ldots,\kappa_i',\ldots,\kappa_n\right)}\,h^{(1)(1')} \tag{4}$$

2 two e

$$\langle\Psi|V|\Psi(m\to p)\rangle = (-1)^{\varepsilon(\kappa)}\,(1/2)*\sum_{PQRS} v^{PQRS}\,\langle 0|\left(\prod_{\kappa=(\kappa_n\ldots\kappa_2)} a_\kappa\right) a_m a_P^\dagger a_R^\dagger a_S a_Q a_p^\dagger \left(\prod_{\kappa'=(\kappa_2\ldots\kappa_n)} a_{\kappa'}^\dagger\right)|0\rangle \tag{5}$$

$$= (-1)^{\varepsilon(\kappa)}\sum_{n=spinIntersection}\left(v^{mpnn}-v^{mnnp}\right) \tag{6}$$

$$= (-1)^{\varepsilon(\kappa)}\sum_{n=spinIntersection}\Big((mp|nn)\delta_{[m][p]}\delta_{[n][n]}-(mn|np)\delta_{[m][n]}\delta_{[n][p]}\Big) \tag{7}$$

$$= (-1)^{\varepsilon(\kappa)}\sum_{n=spinIntersection}\left((mp|nn)-(4/25)*(mn|np)\right) \tag{8}$$