

FCI Questions

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1 two differences

$$\langle \Psi | V | \Psi(k \rightarrow k', l \rightarrow l') \rangle = v^{\alpha\beta\gamma\delta} (-1)^{\varepsilon(\kappa_1, \dots, \kappa'_i, \dots, \kappa_j, \dots, \kappa_n)} \quad (1)$$

$$\langle 0 | \left(\prod_{\kappa=(\kappa_n \dots \kappa_3)} a_\kappa \right) a_2 a_1 a_\alpha^\dagger a_\beta^\dagger a_\gamma a_\delta a_{1'}^\dagger a_{2'}^\dagger \left(\prod_{\kappa'=(\kappa_3 \dots \kappa_n)} a_{\kappa'}^\dagger \right) | 0 \rangle \quad (2)$$

$$= \langle 0 | \left(\prod_{\kappa=(\kappa_n \dots \kappa_3)} a_\kappa \right) a_2 a_1 a_\alpha^\dagger a_\beta^\dagger a_\gamma \delta_{\delta\kappa_{1'}} a_{2'}^\dagger \left(\prod_{\kappa'=(\kappa_3 \dots \kappa_n)} a_{\kappa'}^\dagger \right) | 0 \rangle \quad (3)$$

$$- \langle 0 | \left(\prod_{\kappa=(\kappa_n \dots \kappa_3)} a_\kappa \right) a_2 a_1 a_\alpha^\dagger a_\beta^\dagger a_\gamma a_{1'}^\dagger a_\delta a_{2'}^\dagger \left(\prod_{\kappa'=(\kappa_3 \dots \kappa_n)} a_{\kappa'}^\dagger \right) | 0 \rangle \quad (4)$$

$$= \langle 0 | \left(\prod_{\kappa=(\kappa_n \dots \kappa_3)} a_\kappa \right) a_2 a_1 a_\alpha^\dagger a_\beta^\dagger \delta_{\gamma\kappa_{2'}} \delta_{\delta\kappa_{1'}} \left(\prod_{\kappa'=(\kappa_3 \dots \kappa_n)} a_{\kappa'}^\dagger \right) | 0 \rangle \quad (5)$$

$$- 0 \quad (6)$$

$$- \langle 0 | \left(\prod_{\kappa=(\kappa_n \dots \kappa_3)} a_\kappa \right) a_2 a_1 a_\alpha^\dagger a_\beta^\dagger \delta_{\gamma\kappa_{1'}} a_\delta a_{2'}^\dagger \left(\prod_{\kappa'=(\kappa_3 \dots \kappa_n)} a_{\kappa'}^\dagger \right) | 0 \rangle \quad (7)$$

$$+ 0 \quad (8)$$

$$= \delta_{\alpha\kappa_1} \delta_{\beta\kappa_2} \delta_{\gamma\kappa_{2'}} \delta_{\delta\kappa_{1'}} \quad (9)$$

$$- \delta_{\alpha\kappa_1} \delta_{\beta\kappa_2} \delta_{\gamma\kappa_{1'}} \delta_{\delta\kappa_{2'}} \quad (10)$$

$$= v^{122'1'} - v^{121'2'} \quad (11)$$