$$\langle HF|a_a^\dagger a_b^\dagger a_d a_c c_m^\dagger h_i^\dagger c_o^\dagger h_k^\dagger|HF\rangle \;=\; \langle HF|h_a h_b c_d c_c c_m^\dagger h_i^\dagger c_o^\dagger h_k^\dagger|HF\rangle \tag{1}$$

$$= \langle HF|h_a h_b c_d c_c c_m^\dagger h_i^\dagger c_o^\dagger h_k^\dagger|HF\rangle \;+\; \langle HF|h_a h_b c_d c_c c_m^\dagger h_i^\dagger c_o^\dagger h_k^\dagger|HF\rangle$$

$$+ \langle HF|h_a h_b c_d c_c c_m^\dagger h_i^\dagger c_o^\dagger h_k^\dagger|HF\rangle \;+\; \langle HF|h_a h_b c_d c_c c_m^\dagger h_i^\dagger c_o^\dagger h_k^\dagger|HF\rangle \tag{2}$$

$$= (-1)\delta_{ai}\Theta_{\epsilon_F\epsilon_a}\delta_{bk}\Theta_{\epsilon_F\epsilon_b}\delta_{dm}\Theta_{\epsilon_d\epsilon_F}\delta_{co}\Theta_{\epsilon_c\epsilon_F} \;+\; \delta_{ai}\Theta_{\epsilon_F\epsilon_a}\delta_{bk}\Theta_{\epsilon_F\epsilon_b}\delta_{do}\Theta_{\epsilon_d\epsilon_F}\delta_{cm}\Theta_{\epsilon_c\epsilon_F}$$

$$+ \delta_{ak}\Theta_{\epsilon_F\epsilon_a}\delta_{bi}\Theta_{\epsilon_F\epsilon_b}\delta_{dm}\Theta_{\epsilon_d\epsilon_F}\delta_{co}\Theta_{\epsilon_c\epsilon_F} \;+\; (-1)\delta_{ak}\Theta_{\epsilon_F\epsilon_a}\delta_{bi}\Theta_{\epsilon_F\epsilon_b}\delta_{do}\Theta_{\epsilon_d\epsilon_F}\delta_{cm}\Theta_{\epsilon_c\epsilon_F} \tag{3}$$