$$|1_0\rangle \cdots |1_n\rangle |0_{n+1}\rangle \cdots |0_m\rangle$$

$$\hat{a}_i^\dagger \rightarrow \sum_{j=1}^{m} U_{i,j} \hat{a}_j^\dagger$$

$$\sum_S \gamma_S |n_1^{(S)}, \ldots, n_m^{(S)}\rangle$$

$$P_S = |\gamma_S|^2$$