

$$\begin{aligned}
 \mathbf{m}_{i_{-},j_{-} \rightarrow k_{-}} &:= \mathbb{E} \left[\mathbf{a}_k \alpha_i + \mathbf{a}_k \alpha_j + \mathbf{b}_k \beta_i + \mathbf{b}_k \beta_j, \right. \\
 &\quad \frac{1}{\hbar \mathcal{A}_i \mathcal{A}_j} (\hbar \mathbf{y}_k \mathcal{A}_i \mathcal{A}_j \eta_i + \hbar \mathbf{y}_k \mathcal{A}_j \eta_j + \hbar \mathbf{x}_k \mathcal{A}_i \xi_i + \mathcal{A}_i \mathcal{A}_j \eta_j \xi_i - \\
 &\quad \left. \mathbf{B}_k \mathcal{A}_i \mathcal{A}_j \eta_j \xi_i + \hbar \mathbf{x}_k \mathcal{A}_i \mathcal{A}_j \xi_j), \mathbf{1} \right];
 \end{aligned}$$

$$\mathbf{R}_{i_{-},j_{-}} := \mathbb{E} [\hbar \mathbf{a}_j \mathbf{b}_i, \hbar \mathbf{x}_j \mathbf{y}_i, \mathbf{1}];$$

$$\bar{\mathbf{R}}_{i_{-},j_{-}} := \mathbb{E} \left[-\hbar \mathbf{a}_j \mathbf{b}_i, -\frac{\hbar \mathbf{x}_j \mathbf{y}_i}{\mathbf{B}_i}, \mathbf{1} \right];$$

$$\begin{aligned}
 \mathbf{S}_{i_{-}} &:= \mathbb{E} \left[-\mathbf{a}_i \alpha_i - \mathbf{b}_i \beta_i, \right. \\
 &\quad \left. \frac{1}{\hbar \mathbf{B}_i} (-\hbar \mathbf{y}_i \mathcal{A}_i \eta_i - \hbar \mathbf{B}_i \mathbf{x}_i \mathcal{A}_i \xi_i + \mathcal{A}_i \eta_i \xi_i - \mathbf{B}_i \mathcal{A}_i \eta_i \xi_i), \mathbf{1} \right];
 \end{aligned}$$

$$\begin{aligned}
 \Delta_{i_{-} \rightarrow j_{-},k_{-}} &:= \mathbb{E} [\mathbf{a}_j \alpha_i + \mathbf{a}_k \alpha_i + \mathbf{b}_j \beta_i + \mathbf{b}_k \beta_i, \\
 &\quad \mathbf{y}_j \eta_i + \mathbf{B}_j \mathbf{y}_k \eta_i + \mathbf{x}_j \xi_i + \mathbf{x}_k \xi_i, \mathbf{1}];
 \end{aligned}$$

$$\mathbf{C}_{i_{-}} := \mathbb{E} [\mathbf{0}, \mathbf{0}, \mathbf{B}_i^{1/2}];$$

$$\bar{\mathbf{C}}_{i_{-}} := \mathbb{E} [\mathbf{0}, \mathbf{0}, \mathbf{B}_i^{-1/2}];$$