

term-2-0E

$$[\hat{H}_{t, Ni}^0, \hat{H}_{t, R}] = 0$$

$$\begin{aligned} [\hat{H}_{t, Ni}^+, \hat{H}_{t, Ni}^-] = & -X_{iN}^{\sigma \leftarrow \sigma} X_{jN}^{-\sigma \leftarrow -\sigma} \\ & -X_{jN}^{\sigma \leftarrow \sigma} X_{iN}^{-\sigma \leftarrow -\sigma} + X_{iN}^{-\sigma \leftarrow \sigma} X_{jN}^{\sigma \leftarrow -\sigma} \\ & + X_{jN}^{-\sigma \leftarrow \sigma} X_{iN}^{\sigma \leftarrow -\sigma} \end{aligned}$$

$$\begin{aligned} [\hat{H}_{t, cross}^{0\oplus}, \hat{H}_{t, cross}^{0\ominus}] = & +X_{iN}^{0\leftarrow 0} X_{iR}^{\sigma \leftarrow \sigma} \\ & +X_{iN}^{0\leftarrow 0} X_{iR}^{d\leftarrow d} - X_{iN}^{\sigma \leftarrow \sigma} X_{iR}^{0\leftarrow 0} \\ & -X_{iN}^{\sigma \leftarrow \sigma} X_{iR}^{-\sigma \leftarrow -\sigma} + X_{iN}^{-\sigma \leftarrow \sigma} X_{iR}^{\sigma \leftarrow -\sigma} \end{aligned}$$

$$\begin{aligned} [\hat{H}_{t, cross}^{+\ominus}, \hat{H}_{t, cross}^{-\oplus}] = & -X_{iN}^{-\sigma \leftarrow -\sigma} X_{iR}^{d\leftarrow d} \\ & -X_{iN}^{-\sigma \leftarrow -\sigma} X_{iR}^{\sigma \leftarrow \sigma} + X_{iN}^{\sigma \leftarrow -\sigma} X_{iR}^{-\sigma \leftarrow \sigma} \end{aligned}$$