term-2-all

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

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

$$\begin{aligned}
[\hat{H}^0_{t,Ni}, \hat{H}^{0\oplus}_{t,cross}] = &+ X^{\sigma\leftarrow\sigma}_{iN} X^{0\leftarrow\sigma}_{jN} X^{\sigma\leftarrow 0}_{iR} \\
&+ \eta(\sigma) X^{\sigma\leftarrow\sigma}_{iN} X^{0\leftarrow\sigma}_{jN} X^{d\leftarrow -\sigma}_{iR} + X^{\sigma\leftarrow -\sigma}_{iN} X^{0\leftarrow\sigma}_{jN} X^{-\sigma\leftarrow 0}_{iR} \\
&- \eta(\sigma) X^{\sigma\leftarrow -\sigma}_{iN} X^{0\leftarrow\sigma}_{jN} X^{d\leftarrow\sigma}_{iR} - X^{0\leftarrow 0}_{iN} X^{\sigma\leftarrow 0}_{iR} X^{0\leftarrow\sigma}_{jN} \\
&- \eta(\sigma) X^{0\leftarrow 0}_{iN} X^{d\leftarrow -\sigma}_{iR} X^{0\leftarrow\sigma}_{jN} - X^{0\leftarrow d}_{iN} X^{-\sigma\leftarrow 0}_{iR} X^{d\leftarrow -\sigma}_{jN} \\
&+ \eta(\sigma) X^{0\leftarrow d}_{iN} X^{d\leftarrow\sigma}_{iR} X^{d\leftarrow -\sigma}_{jN}
\end{aligned}$$

$$\begin{aligned}
[\hat{H}^0_{t,Ni}, \hat{H}^{0\ominus}_{t,cross}] = &+ X^{\sigma\leftarrow 0}_{jN} X^{0\leftarrow 0}_{iN} X^{0\leftarrow\sigma}_{iR} \\
&+ \eta(\sigma) X^{\sigma\leftarrow 0}_{jN} X^{0\leftarrow 0}_{iN} X^{-\sigma\leftarrow d}_{iR} + X^{-\sigma\leftarrow d}_{jN} X^{d\leftarrow 0}_{iN} X^{0\leftarrow -\sigma}_{iR} \\
&- \eta(\sigma) X^{-\sigma\leftarrow d}_{jN} X^{d\leftarrow 0}_{iN} X^{\sigma\leftarrow d}_{iR} - X^{\sigma\leftarrow\sigma}_{iN} X^{0\leftarrow\sigma}_{iR} X^{\sigma\leftarrow 0}_{jN} \\
&- \eta(\sigma) X^{\sigma\leftarrow\sigma}_{iN} X^{-\sigma\leftarrow d}_{iR} X^{\sigma\leftarrow 0}_{jN} - X^{-\sigma\leftarrow\sigma}_{iN} X^{0\leftarrow -\sigma}_{iR} X^{\sigma\leftarrow 0}_{jN} \\
&+ \eta(\sigma) X^{-\sigma\leftarrow\sigma}_{iN} X^{\sigma\leftarrow d}_{iR} X^{\sigma\leftarrow 0}_{jN}
\end{aligned}$$

$$\begin{aligned}
[\hat{H}^0_{t,Ni}, \hat{H}^{+\ominus}_{t,cross}] = &+ X^{-\sigma\leftarrow -\sigma}_{iN} X^{d\leftarrow -\sigma}_{jN} X^{-\sigma\leftarrow d}_{iR} \\
&+ \eta(\sigma) X^{-\sigma\leftarrow -\sigma}_{iN} X^{d\leftarrow -\sigma}_{jN} X^{0\leftarrow\sigma}_{iR} + X^{-\sigma\leftarrow\sigma}_{iN} X^{d\leftarrow -\sigma}_{jN} X^{\sigma\leftarrow d}_{iR} \\
&- \eta(\sigma) X^{-\sigma\leftarrow\sigma}_{iN} X^{d\leftarrow -\sigma}_{jN} X^{0\leftarrow -\sigma}_{iR} - X^{d\leftarrow d}_{iN} X^{-\sigma\leftarrow d}_{iR} X^{d\leftarrow -\sigma}_{jN} \\
&- \eta(\sigma) X^{d\leftarrow d}_{iN} X^{0\leftarrow\sigma}_{iR} X^{d\leftarrow -\sigma}_{jN} - X^{d\leftarrow 0}_{iN} X^{\sigma\leftarrow d}_{iR} X^{0\leftarrow\sigma}_{jN} \\
&+ \eta(\sigma) X^{d\leftarrow 0}_{iN} X^{0\leftarrow -\sigma}_{iR} X^{0\leftarrow\sigma}_{jN}
\end{aligned}$$

$$\begin{aligned}
[\hat{H}^0_{t,Ni}, \hat{H}^{-\oplus}_{t,cross}] = &+ X^{\sigma\leftarrow 0}_{jN} X^{0\leftarrow d}_{iN} X^{d\leftarrow\sigma}_{iR} \\
&- \eta(\sigma) X^{\sigma\leftarrow 0}_{jN} X^{0\leftarrow d}_{iN} X^{-\sigma\leftarrow 0}_{iR} + X^{-\sigma\leftarrow d}_{jN} X^{d\leftarrow d}_{iN} X^{d\leftarrow -\sigma}_{iR} \\
&+ \eta(\sigma) X^{-\sigma\leftarrow d}_{jN} X^{d\leftarrow d}_{iN} X^{\sigma\leftarrow 0}_{iR} - X^{-\sigma\leftarrow -\sigma}_{iN} X^{d\leftarrow -\sigma}_{iR} X^{-\sigma\leftarrow d}_{jN} \\
&- \eta(\sigma) X^{-\sigma\leftarrow -\sigma}_{iN} X^{\sigma\leftarrow 0}_{iR} X^{-\sigma\leftarrow d}_{jN} - X^{\sigma\leftarrow -\sigma}_{iN} X^{d\leftarrow\sigma}_{iR} X^{-\sigma\leftarrow d}_{jN} \\
&+ \eta(\sigma) X^{\sigma\leftarrow -\sigma}_{iN} X^{-\sigma\leftarrow 0}_{iR} X^{-\sigma\leftarrow d}_{jN}
\end{aligned}$$

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

$$\begin{aligned}
[\hat{H}^{+}_{t,Ni}, \hat{H}^{-}_{t,Ni}] = &+ X^{d\leftarrow d}_{iN} X^{0\leftarrow 0}_{jN} \\
&- X^{d\leftarrow 0}_{iN} X^{0\leftarrow d}_{jN} + X^{d\leftarrow d}_{jN} X^{0\leftarrow 0}_{iN} \\
&- X^{d\leftarrow 0}_{jN} X^{0\leftarrow d}_{iN} - X^{\sigma\leftarrow\sigma}_{iN} X^{-\sigma\leftarrow-\sigma}_{jN} \\
&- X^{\sigma\leftarrow\sigma}_{jN} X^{-\sigma\leftarrow-\sigma}_{iN} + X^{-\sigma\leftarrow\sigma}_{iN} X^{\sigma\leftarrow-\sigma}_{jN} \\
&+ X^{-\sigma\leftarrow\sigma}_{jN} X^{\sigma\leftarrow-\sigma}_{iN}
\end{aligned}$$

$$[\hat{H}^{+}_{t,Ni}, \hat{H}^{0\oplus}_{t,cross}] = 0$$

$$\begin{aligned}
[\hat{H}^{+}_{t,Ni}, \hat{H}^{0\ominus}_{t,cross}] = &+ \eta(\sigma) X^{d\leftarrow 0}_{iN} X^{0\leftarrow\sigma}_{jN} X^{0\leftarrow-\sigma}_{iR} \\
&- X^{d\leftarrow 0}_{iN} X^{0\leftarrow\sigma}_{jN} X^{\sigma\leftarrow d}_{iR} + \eta(\sigma) X^{d\leftarrow-\sigma}_{jN} X^{0\leftarrow 0}_{iN} X^{0\leftarrow\sigma}_{iR} \\
&+ X^{d\leftarrow-\sigma}_{jN} X^{0\leftarrow 0}_{iN} X^{-\sigma\leftarrow d}_{iR} - \eta(\sigma) X^{\sigma\leftarrow\sigma}_{iN} X^{0\leftarrow\sigma}_{iR} X^{d\leftarrow-\sigma}_{jN} \\
&- X^{\sigma\leftarrow\sigma}_{iN} X^{-\sigma\leftarrow d}_{iR} X^{d\leftarrow-\sigma}_{jN} - \eta(\sigma) X^{-\sigma\leftarrow\sigma}_{iN} X^{0\leftarrow-\sigma}_{iR} X^{d\leftarrow-\sigma}_{jN} \\
&+ X^{-\sigma\leftarrow\sigma}_{iN} X^{\sigma\leftarrow d}_{iR} X^{d\leftarrow-\sigma}_{jN}
\end{aligned}$$

$$[\hat{H}^{+}_{t,Ni}, \hat{H}^{+\ominus}_{t,cross}] = 0$$

$$\begin{aligned}
[\hat{H}^{+}_{t,Ni}, \hat{H}^{-\oplus}_{t,cross}] = &+ \eta(\sigma) X^{d\leftarrow d}_{iN} X^{0\leftarrow\sigma}_{jN} X^{d\leftarrow-\sigma}_{iR} \\
&+ X^{d\leftarrow d}_{iN} X^{0\leftarrow\sigma}_{jN} X^{\sigma\leftarrow 0}_{iR} + \eta(\sigma) X^{d\leftarrow-\sigma}_{jN} X^{0\leftarrow d}_{iN} X^{d\leftarrow\sigma}_{iR} \\
&- X^{d\leftarrow-\sigma}_{jN} X^{0\leftarrow d}_{iN} X^{-\sigma\leftarrow 0}_{iR} - \eta(\sigma) X^{-\sigma\leftarrow-\sigma}_{iN} X^{d\leftarrow-\sigma}_{iR} X^{0\leftarrow\sigma}_{jN} \\
&- X^{-\sigma\leftarrow-\sigma}_{iN} X^{\sigma\leftarrow 0}_{iR} X^{0\leftarrow\sigma}_{jN} - \eta(\sigma) X^{\sigma\leftarrow-\sigma}_{iN} X^{d\leftarrow\sigma}_{iR} X^{0\leftarrow\sigma}_{jN} \\
&+ X^{\sigma\leftarrow-\sigma}_{iN} X^{-\sigma\leftarrow 0}_{iR} X^{0\leftarrow\sigma}_{jN}
\end{aligned}$$

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

$$\begin{aligned}
[\hat{H}^{-}_{t,Ni}, \hat{H}^{0\oplus}_{t,cross}] = &+ \eta(\sigma) X^{\sigma\leftarrow\sigma}_{iN} X^{-\sigma\leftarrow d}_{jN} X^{\sigma\leftarrow 0}_{iR} \\
&+ X^{\sigma\leftarrow\sigma}_{iN} X^{-\sigma\leftarrow d}_{jN} X^{d\leftarrow-\sigma}_{iR} + \eta(\sigma) X^{\sigma\leftarrow-\sigma}_{iN} X^{-\sigma\leftarrow d}_{jN} X^{-\sigma\leftarrow 0}_{iR} \\
&- X^{\sigma\leftarrow-\sigma}_{iN} X^{-\sigma\leftarrow d}_{jN} X^{d\leftarrow\sigma}_{iR} - \eta(\sigma) X^{0\leftarrow 0}_{iN} X^{\sigma\leftarrow 0}_{iR} X^{-\sigma\leftarrow d}_{jN} \\
&- X^{0\leftarrow 0}_{iN} X^{d\leftarrow-\sigma}_{iR} X^{-\sigma\leftarrow d}_{jN} - \eta(\sigma) X^{0\leftarrow d}_{iN} X^{-\sigma\leftarrow 0}_{iR} X^{\sigma\leftarrow 0}_{jN} \\
&+ X^{0\leftarrow d}_{iN} X^{d\leftarrow\sigma}_{iR} X^{\sigma\leftarrow 0}_{jN}
\end{aligned}$$

$$[\hat{H}^{-}_{t,Ni}, \hat{H}^{0\ominus}_{t,cross}] = 0$$

$$\begin{aligned}
[\hat{H}^{-}_{t,Ni}, \hat{H}^{+\ominus}_{t,cross}] = &+ \eta(\sigma) X^{\sigma\leftarrow 0}_{jN} X^{-\sigma\leftarrow -\sigma}_{iN} X^{-\sigma\leftarrow d}_{iR} \\
&+ X^{\sigma\leftarrow 0}_{jN} X^{-\sigma\leftarrow -\sigma}_{iN} X^{0\leftarrow \sigma}_{iR} + \eta(\sigma) X^{\sigma\leftarrow 0}_{jN} X^{-\sigma\leftarrow \sigma}_{iN} X^{\sigma\leftarrow d}_{iR} \\
&- X^{\sigma\leftarrow 0}_{jN} X^{-\sigma\leftarrow \sigma}_{iN} X^{0\leftarrow -\sigma}_{iR} - \eta(\sigma) X^{d\leftarrow d}_{iN} X^{-\sigma\leftarrow d}_{iR} X^{\sigma\leftarrow 0}_{jN} \\
&- X^{d\leftarrow d}_{iN} X^{0\leftarrow \sigma}_{iR} X^{\sigma\leftarrow 0}_{jN} - \eta(\sigma) X^{d\leftarrow 0}_{iN} X^{\sigma\leftarrow d}_{iR} X^{-\sigma\leftarrow d}_{jN} \\
&+ X^{d\leftarrow 0}_{iN} X^{0\leftarrow -\sigma}_{iR} X^{-\sigma\leftarrow d}_{jN}
\end{aligned}$$

$$[\hat{H}^{-}_{t,Ni}, \hat{H}^{-\oplus}_{t,cross}] = 0$$

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

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

$$[\hat{H}^{0\oplus}_{t,cross}, \hat{H}^{+\ominus}_{t,cross}] = 0$$

$$[\hat{H}^{0\oplus}_{t,cross}, \hat{H}^{-\oplus}_{t,cross}] = - X^{0\leftarrow d}_{iN} X^{d\leftarrow 0}_{iR}$$

$$\begin{aligned}
[\hat{H}^{0\oplus}_{t,cross}, \hat{H}_{t,R}] = &+ X^{0\leftarrow\sigma}_{iN} X^{\sigma\leftarrow\sigma}_{iR} X^{\sigma\leftarrow 0}_{jR} \\
&+ \eta(\sigma) X^{0\leftarrow\sigma}_{iN} X^{\sigma\leftarrow\sigma}_{iR} X^{d\leftarrow -\sigma}_{jR} + X^{0\leftarrow\sigma}_{iN} X^{\sigma\leftarrow -\sigma}_{iR} X^{-\sigma\leftarrow 0}_{jR} \\
&- \eta(\sigma) X^{0\leftarrow\sigma}_{iN} X^{\sigma\leftarrow -\sigma}_{iR} X^{d\leftarrow\sigma}_{jR} + X^{0\leftarrow\sigma}_{iN} X^{d\leftarrow d}_{iR} X^{\sigma\leftarrow 0}_{jR} \\
&+ \eta(\sigma) X^{0\leftarrow\sigma}_{iN} X^{d\leftarrow d}_{iR} X^{d\leftarrow -\sigma}_{jR} + \eta(\sigma) X^{0\leftarrow\sigma}_{iN} X^{d\leftarrow 0}_{iR} X^{0\leftarrow -\sigma}_{jR} \\
&- X^{0\leftarrow\sigma}_{iN} X^{d\leftarrow 0}_{iR} X^{\sigma\leftarrow d}_{jR} - X^{\sigma\leftarrow 0}_{jR} X^{0\leftarrow 0}_{iR} X^{0\leftarrow\sigma}_{iN} \\
&- X^{\sigma\leftarrow 0}_{jR} X^{-\sigma\leftarrow -\sigma}_{iR} X^{0\leftarrow\sigma}_{iN} - \eta(\sigma) X^{d\leftarrow -\sigma}_{jR} X^{0\leftarrow 0}_{iR} X^{0\leftarrow\sigma}_{iN} \\
&- \eta(\sigma) X^{d\leftarrow -\sigma}_{jR} X^{-\sigma\leftarrow -\sigma}_{iR} X^{0\leftarrow\sigma}_{iN} + \eta(\sigma) X^{d\leftarrow 0}_{iR} X^{0\leftarrow -\sigma}_{jR} X^{0\leftarrow\sigma}_{iN} \\
&- X^{d\leftarrow 0}_{iR} X^{\sigma\leftarrow d}_{jR} X^{0\leftarrow\sigma}_{iN} + X^{-\sigma\leftarrow 0}_{jR} X^{\sigma\leftarrow -\sigma}_{iR} X^{0\leftarrow\sigma}_{iN} \\
&- \eta(\sigma) X^{d\leftarrow\sigma}_{jR} X^{\sigma\leftarrow -\sigma}_{iR} X^{0\leftarrow\sigma}_{iN}
\end{aligned}$$

$$[\hat{H}^{0\ominus}_{t,cross}, \hat{H}^{+\ominus}_{t,cross}] = + X^{d\leftarrow 0}_{iN} X^{0\leftarrow d}_{iR}$$

$$[\hat{H}^{0\ominus}_{t,cross}, \hat{H}^{-\oplus}_{t,cross}] = 0$$

$$\begin{aligned}
[\hat{H}^{0\ominus}_{t,cross}, \hat{H}_{t,R}] = &+ X^{\sigma\leftarrow 0}_{iN} X^{0\leftarrow 0}_{iR} X^{0\leftarrow\sigma}_{jR} \\
&+ \eta(\sigma) X^{\sigma\leftarrow 0}_{iN} X^{0\leftarrow 0}_{iR} X^{-\sigma\leftarrow d}_{jR} - \eta(\sigma) X^{\sigma\leftarrow 0}_{iN} X^{0\leftarrow d}_{iR} X^{-\sigma\leftarrow 0}_{jR} \\
&+ X^{\sigma\leftarrow 0}_{iN} X^{0\leftarrow d}_{iR} X^{d\leftarrow\sigma}_{jR} + X^{\sigma\leftarrow 0}_{iN} X^{-\sigma\leftarrow -\sigma}_{iR} X^{0\leftarrow\sigma}_{jR} \\
&+ \eta(\sigma) X^{\sigma\leftarrow 0}_{iN} X^{-\sigma\leftarrow -\sigma}_{iR} X^{-\sigma\leftarrow d}_{jR} - X^{\sigma\leftarrow 0}_{iN} X^{-\sigma\leftarrow\sigma}_{iR} X^{0\leftarrow -\sigma}_{jR} \\
&+ \eta(\sigma) X^{\sigma\leftarrow 0}_{iN} X^{-\sigma\leftarrow\sigma}_{iR} X^{\sigma\leftarrow d}_{jR} - X^{\sigma\leftarrow\sigma}_{iR} X^{0\leftarrow\sigma}_{jR} X^{\sigma\leftarrow 0}_{iN} \\
&- \eta(\sigma) X^{\sigma\leftarrow\sigma}_{iR} X^{-\sigma\leftarrow d}_{jR} X^{\sigma\leftarrow 0}_{iN} - X^{d\leftarrow d}_{iR} X^{0\leftarrow\sigma}_{jR} X^{\sigma\leftarrow 0}_{iN} \\
&- \eta(\sigma) X^{d\leftarrow d}_{iR} X^{-\sigma\leftarrow d}_{jR} X^{\sigma\leftarrow 0}_{iN} - X^{-\sigma\leftarrow -\sigma}_{iR} X^{0\leftarrow -\sigma}_{jR} X^{\sigma\leftarrow 0}_{iN} \\
&+ \eta(\sigma) X^{-\sigma\leftarrow -\sigma}_{iR} X^{\sigma\leftarrow d}_{jR} X^{\sigma\leftarrow 0}_{iN} - \eta(\sigma) X^{-\sigma\leftarrow 0}_{jR} X^{0\leftarrow d}_{iR} X^{\sigma\leftarrow 0}_{iN} \\
&+ X^{d\leftarrow\sigma}_{jR} X^{0\leftarrow d}_{iR} X^{\sigma\leftarrow 0}_{iN}
\end{aligned}$$

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

$$\begin{aligned}
[\hat{H}^{+\ominus}_{t,cross}, \hat{H}_{t,R}] = &+ \eta(\sigma) X^{d\leftarrow -\sigma}_{iN} X^{-\sigma\leftarrow -\sigma}_{iR} X^{0\leftarrow\sigma}_{jR} \\
&+ X^{d\leftarrow -\sigma}_{iN} X^{-\sigma\leftarrow -\sigma}_{iR} X^{-\sigma\leftarrow d}_{jR} - \eta(\sigma) X^{d\leftarrow -\sigma}_{iN} X^{-\sigma\leftarrow\sigma}_{iR} X^{0\leftarrow -\sigma}_{jR} \\
&+ X^{d\leftarrow -\sigma}_{iN} X^{-\sigma\leftarrow\sigma}_{iR} X^{\sigma\leftarrow d}_{jR} + \eta(\sigma) X^{d\leftarrow -\sigma}_{iN} X^{0\leftarrow 0}_{iR} X^{0\leftarrow\sigma}_{jR} \\
&+ X^{d\leftarrow -\sigma}_{iN} X^{0\leftarrow 0}_{iR} X^{-\sigma\leftarrow d}_{jR} - X^{d\leftarrow -\sigma}_{iN} X^{0\leftarrow d}_{iR} X^{-\sigma\leftarrow 0}_{jR} \\
&+ \eta(\sigma) X^{d\leftarrow -\sigma}_{iN} X^{0\leftarrow d}_{iR} X^{d\leftarrow\sigma}_{jR} - \eta(\sigma) X^{\sigma\leftarrow\sigma}_{iR} X^{0\leftarrow\sigma}_{jR} X^{d\leftarrow -\sigma}_{iN} \\
&- X^{\sigma\leftarrow\sigma}_{iR} X^{-\sigma\leftarrow d}_{jR} X^{d\leftarrow -\sigma}_{iN} - \eta(\sigma) X^{d\leftarrow d}_{iR} X^{0\leftarrow\sigma}_{jR} X^{d\leftarrow -\sigma}_{iN} \\
&- X^{d\leftarrow d}_{iR} X^{-\sigma\leftarrow d}_{jR} X^{d\leftarrow -\sigma}_{iN} - \eta(\sigma) X^{-\sigma\leftarrow\sigma}_{iR} X^{0\leftarrow -\sigma}_{jR} X^{d\leftarrow -\sigma}_{iN} \\
&+ X^{-\sigma\leftarrow\sigma}_{iR} X^{\sigma\leftarrow d}_{jR} X^{d\leftarrow -\sigma}_{iN} - X^{-\sigma\leftarrow 0}_{jR} X^{0\leftarrow d}_{iR} X^{d\leftarrow -\sigma}_{iN} \\
&+ \eta(\sigma) X^{d\leftarrow\sigma}_{jR} X^{0\leftarrow d}_{iR} X^{d\leftarrow -\sigma}_{iN}
\end{aligned}$$

$$\begin{aligned}
[\hat{H}^{-\oplus}_{t,cross}, \hat{H}_{t,R}] = &+ \eta(\sigma) X^{-\sigma\leftarrow d}_{iN} X^{d\leftarrow d}_{iR} X^{\sigma\leftarrow 0}_{jR} \\
&+ X^{-\sigma\leftarrow d}_{iN} X^{d\leftarrow d}_{iR} X^{d\leftarrow -\sigma}_{jR} + X^{-\sigma\leftarrow d}_{iN} X^{d\leftarrow 0}_{iR} X^{0\leftarrow -\sigma}_{jR} \\
&- \eta(\sigma) X^{-\sigma\leftarrow d}_{iN} X^{d\leftarrow 0}_{iR} X^{\sigma\leftarrow d}_{jR} + \eta(\sigma) X^{-\sigma\leftarrow d}_{iN} X^{\sigma\leftarrow\sigma}_{iR} X^{\sigma\leftarrow 0}_{jR} \\
&+ X^{-\sigma\leftarrow d}_{iN} X^{\sigma\leftarrow\sigma}_{iR} X^{d\leftarrow -\sigma}_{jR} + \eta(\sigma) X^{-\sigma\leftarrow d}_{iN} X^{\sigma\leftarrow -\sigma}_{iR} X^{-\sigma\leftarrow 0}_{jR} \\
&- X^{-\sigma\leftarrow d}_{iN} X^{\sigma\leftarrow -\sigma}_{iR} X^{d\leftarrow\sigma}_{jR} - \eta(\sigma) X^{\sigma\leftarrow 0}_{jR} X^{0\leftarrow 0}_{iR} X^{-\sigma\leftarrow d}_{iN} \\
&- \eta(\sigma) X^{\sigma\leftarrow 0}_{jR} X^{-\sigma\leftarrow -\sigma}_{iR} X^{-\sigma\leftarrow d}_{iN} - X^{d\leftarrow -\sigma}_{jR} X^{0\leftarrow 0}_{iR} X^{-\sigma\leftarrow d}_{iN} \\
&- X^{d\leftarrow -\sigma}_{jR} X^{-\sigma\leftarrow -\sigma}_{iR} X^{-\sigma\leftarrow d}_{iN} + X^{d\leftarrow 0}_{iR} X^{0\leftarrow -\sigma}_{jR} X^{-\sigma\leftarrow d}_{iN} \\
&- \eta(\sigma) X^{d\leftarrow 0}_{iR} X^{\sigma\leftarrow d}_{jR} X^{-\sigma\leftarrow d}_{iN} + \eta(\sigma) X^{-\sigma\leftarrow 0}_{jR} X^{\sigma\leftarrow -\sigma}_{iR} X^{-\sigma\leftarrow d}_{iN} \\
&- X^{d\leftarrow\sigma}_{jR} X^{\sigma\leftarrow -\sigma}_{iR} X^{-\sigma\leftarrow d}_{iN}
\end{aligned}$$