$$\Delta\frac{a\ \big|\ b}{c\ \big|\ d}\ =\frac{a\ \big|\ b}{c\ \big|\ d}\ \boxtimes\frac{a\ \big|\ b}{c\ \big|\ d}\ =\frac{a\boxtimes a+b\boxtimes c\ \big|\ a\boxtimes b+b\boxtimes d}{c\boxtimes a+d\boxtimes c\ \big|\ c\boxtimes b+d\boxtimes d}$$

$$\Delta\,\underline{ab-qba}\ =\ \underline{\Delta a}\boxtimes\underline{\Delta b}-q\,\underline{\Delta b}\,\underline{\Delta a}\ =\ \underline{a\boxtimes a+b\boxtimes c}\,\underline{a\boxtimes b+b\boxtimes d}\ -q\,\underline{a\boxtimes b+b\boxtimes d}\,\underline{a\boxtimes a+b\boxtimes c}$$

$$=aa\underset{*}{\boxtimes}ab+ab\boxtimes ad+ba\boxtimes cb+bb\underset{\sharp}{\boxtimes}cd-qaa\underset{*}{\boxtimes}ba-qab\boxtimes bc-qba\boxtimes da-qbb\underset{\sharp}{\boxtimes}dc$$

$$=aa\underset{*}{\boxtimes}\underbrace{ab-qba}_{\in\mathcal{I}}+bb\underset{\sharp}{\boxtimes}\underbrace{cd-qdc}_{\in\mathcal{I}}+\underbrace{ab-qba}_{\in\mathcal{I}}\boxtimes\underline{da-q^{-1}cb}+ab\boxtimes\underbrace{ad-qbc-da+q^{-1}cb}_{\in\mathcal{I}}$$

$$\Delta\,\underline{bc-cb}\ =\ \underline{\Delta b}\boxtimes\underline{\Delta c}\ -\ \underline{\Delta c}\,\underline{\Delta b}\ =\ \underline{a\boxtimes b+b\boxtimes d}\,\underline{c\boxtimes a+d\boxtimes c}\ -\ \underline{c\boxtimes a+d\boxtimes c}\,\underline{a\boxtimes b+b\boxtimes d}$$

$$=ac\underset{*}{\boxtimes}ba+ad\underset{+}{\boxtimes}bc+bc\underset{-}{\boxtimes}da+bd\underset{\sharp}{\boxtimes}dc-ca\underset{*}{\boxtimes}ab-cb\underset{-}{\boxtimes}ad-da\underset{+}{\boxtimes}cb-db\underset{\sharp}{\boxtimes}cd$$

$$=\underline{ac-qca}\underset{*}{\boxtimes}ba-ca\underset{*}{\boxtimes}\underline{ab-qba}+\underline{bd-qdb}\underset{\sharp}{\boxtimes}dc-db\underset{\sharp}{\boxtimes}\underline{cd-qdc}$$

$$+\underline{ad-qbc-da+q^{-1}cb}\underset{+}{\boxtimes}bc+da\underset{+}{\boxtimes}\underline{bc-cb}-cb\underset{-}{\boxtimes}\underline{ad-qbc-da+q^{-1}cb}+\underline{bc-cb}\underset{-}{\boxtimes}da$$

$$+q\underline{bc-cb}\boxtimes bc+\,q^{-1}\,cb\boxtimes\underline{cb-bc}$$

$$\Delta\,\underline{ad-qbc-da+q^{-1}cb}\ =\Delta a\Delta d-q\Delta b\Delta c-\Delta d\Delta a+\,q^{-1}\,\Delta c\Delta b$$

$$=\ \underline{a\boxtimes b+b\boxtimes d}\,\underline{c\boxtimes b+d\boxtimes d}\ -q\,\underline{a\boxtimes b+b\boxtimes d}\,\underline{c\boxtimes a+d\boxtimes c}\ -\ \underline{c\boxtimes b+d\boxtimes d}\,\underline{a\boxtimes b+b\boxtimes d}\ +\,q^{-1}\,\underline{c\boxtimes a+d\boxtimes c}\,\underline{a\boxtimes b+b\boxtimes d}$$

$$ba=qab\colon\quad ca=qac\colon\quad db=qbd\colon\quad dc=qcd\colon\quad bc=cb\colon\quad ad-\,q^{-1}bc=da-qbc$$

$$KE=\,q^2\,EK$$

$$KF=\,q^{-2}\,FK$$

$$EF-FE=\frac{K-K^{-1}}{q-q^{-1}}$$

$$\Delta E=1\boxtimes E+E\boxtimes K$$

$$\Delta F=\,K^{-1}\boxtimes F+F\boxtimes 1$$

$$E|b=1=F|c\colon\quad K|a=q\colon\quad K|d=\,q^{-1}$$

$$\deg\,E^i\,F^j\,K^\ell=i\,\curlyvee\,j$$

$$\deg P\geqslant 3\Longrightarrow\Delta P=\,P_\alpha\boxtimes^\alpha P\Longrightarrow\deg\,P_\alpha\geqslant 2\Longrightarrow\,P_\alpha|\frac{a\ \big|\ b}{c\ \big|\ d}\ =0\Longrightarrow\Delta P|\,{}^ig_{\,j}\,{}^kg_{\,\ell}=0$$

$$\Longrightarrow\ \text{comm relations for }{}^ig_{\,j}\,{}^kg_{\,\ell}$$

$$\deg P\leqslant 2$$

K^ℓ	1	F	F^2
1	$ad=1=da$	$\begin{array}{ccccccc} c & a & = & q^{2\ell} & = & q & a & c \\ d & c & = & q & = & q & c & d \end{array}$	0
E	$\begin{array}{ccccccc} b & a & = & q & = & q & a & b \\ d & b & = & q^{-2\ell} & = & q & b & d \end{array}$	$\begin{array}{c} bc=1=cb \\ da=q=qad \end{array}$	$ca=\alpha_{_2}q^{2\ell\,-\,1}=qac$
E^2	0	$ba=\alpha_{_4}=qab$	0