$$\mathbb{C}\colon\quad \left(\begin{array}{c|c} a & b \\ \hline d & c \end{array}\right) \in G$$

$$\overbrace{\eta a + \xi d}^{*}\ \underline{\eta b + \xi c} = \underline{\overset{*}{a} + \overset{*}{d}\overset{*}{u}}\, x \underline{\overset{*}{u} b + c}\, x^{u} \underline{\overset{\ddagger}{g}}$$

$$\text{LHS} = \underline{\overset{*}{a}\overset{*}{\eta} + \overset{*}{d}\overset{*}{\xi}}\ \underline{\eta b + \xi c} = \overset{*}{a}\ \underbrace{\overset{*}{\eta}\eta}_{= x\overset{*}{u}}\ b + \overset{*}{a}\ \underbrace{\overset{*}{\eta}\xi}_{= x}\ c + \overset{*}{d}\ \underbrace{\overset{*}{\xi}\eta}_{= \overset{*}{u}x\overset{*}{u}}\ b + \overset{*}{d}\ \underbrace{\overset{*}{\xi}\xi}_{= \overset{*}{u}x}\ c$$

$$= \overset{*}{a}\, x\, \overset{*}{u}\, b + \overset{*}{a}\, x c + \overset{*}{d}\, \overset{*}{u}\, x\, \overset{*}{u}\, b + \overset{*}{d}\, \overset{*}{u}\, x c = \text{RHS}$$