$$\mathbb{1}\boxtimes\mathbb{1} \underset{\text{bi-mod}}{\sqsupset} {}^{\sharp}\mathbb{1}\llcorner\mathbb{1} := \ker\mu = \frac{1^{j}\boxtimes_{j}1}{1^{j}{}_{j}1 = 0} = {}^{\sharp}\mathbb{1}\llcorner\mathbb{1}^{1}$$

$$\mathbb{1}\boxtimes\mathbb{1}\ \text{bi-mod}\ a\underbrace{b\boxtimes c}d := \underbrace{ac}\boxtimes\underbrace{bd}$$

$$1^{j}\boxtimes_{j}1 \in \ker\mu \Rightarrow \underbrace{11^{j}}{}_{j}\overbrace{11'} = 1\underbrace{1^{j}{}_{j}1}_{=0}1' = 0 \Rightarrow 1\underbrace{1^{j}\boxtimes_{j}1}1' = \underbrace{11^{j}}\boxtimes_{j}\overbrace{11'} \in \ker\mu$$

$${}^{\sharp}\mathbb{1}\llcorner\mathbb{1} = \mathbb{1}\underbrace{d\mathbb{1}} = \underbrace{d\mathbb{1}}\mathbb{1}$$

$${}^{\sharp}\mathbb{1}\llcorner\mathbb{1} \ni 1^{j}\boxtimes_{j}1 = 1^{j}\overbrace{d_{j}1} = -\underbrace{d1^{j}}{}_{j}1$$

$$1^{j}\overbrace{d_{j}1} = 1^{j}\overbrace{1\boxtimes_{j}1 - {}_{j}1\boxtimes 1} = 1^{j}\boxtimes_{j}1 - \underbrace{1^{j}{}_{j}1}_{=0} {}_{=}\boxtimes 1^{j}\boxtimes_{j}1$$

$$\underbrace{d1^{j}}{}_{j}1 = \underbrace{1\boxtimes 1^{j} - 1^{j}\boxtimes 1}{}_{j}1 = 1\boxtimes\underbrace{1^{j}{}_{j}1}_{=0} - 1^{j}\boxtimes_{j}1 = -1^{j}\boxtimes_{j}1$$

$$\begin{tikzcd}
\overbrace{{}^{\sharp}\mathbb{1}\llcorner\mathbb{1}^{1}}^{2}\ \mathbb{1}\ \text{lin}\ \mathbb{1} \arrow[d, "\imath"] \\
{}^{\sharp}\mathbb{1}\llcorner\mathbb{1}^{1} \arrow[d, "\jmath"] \\
{}^{\sharp}\mathbb{1}\llcorner\mathbb{1}^{1} = {}^{\sharp}\mathbb{1}\llcorner\mathbb{1}^{1} \ulcorner \overbrace{{}^{\sharp}\mathbb{1}\llcorner\mathbb{1}^{1}}^{2}
\end{tikzcd}$$

$$\mathbb{1}\ \text{abel} \Rightarrow \bigwedge_{t\,\in\,\mathbb{1}\boxtimes\mathbb{1}} \underbrace{a\boxtimes b}t = atb$$

$$\underbrace{a \text{⧗} b}\underbrace{c \text{⧗} d} = ac \text{⧗} bd \underset{\text{abel}}{=} ac \text{⧗} db = a\underbrace{c \text{⧗} d}b$$

$$\mathbb{1} \text{⧗} \mathbb{1} \text{ abel alg } \underbrace{a \text{⧗} b}\underbrace{c \text{⧗} d} := ac \text{⧗} bd$$

$$\mathbb{1} \text{⧗} \mathbb{1} \underset{ex}{\sqsupset} \overset{\sharp}{\mathbb{1}} \text{◺} \mathbb{1} := \ker \mu = \begin{cases} 1^{j} \text{⧗}_{j} 1 \\ 1^{j}{}_{j} 1 = 0 \end{cases} = \overset{\sharp}{\mathbb{1}} \text{◺} \overset{1}{\mathbb{1}}$$