

$$\begin{array}{ccccc}
& & X \otimes (Y \otimes Z) & \xrightarrow{\sigma_{X,Y \otimes Z}} & (Y \otimes Z) \otimes X \\
& \nearrow \alpha_{X,Y,Z} & & & \searrow \alpha_{Y,Z,X} \\
(X \otimes Y) \otimes Z & & & & Y \otimes (Z \otimes X) \\
& \searrow \sigma_{X,Y} \otimes 1_Z & (Y \otimes X) \otimes Z & \xrightarrow{\alpha_{Y,X,Z}} & Y \otimes (X \otimes Z) \\
& & & & \nearrow 1_Y \otimes \sigma_{X,Z}
\end{array} \tag{1}$$

$$\begin{array}{ccccc}
& & (X \otimes Y) \otimes Z & \xrightarrow{\sigma_{X \otimes Y,Z}} & Z \otimes (X \otimes Y) \\
& \nearrow \alpha_{X,Y,Z}^{-1} & & & \searrow \alpha_{Y,Z,X}^{-1} \\
X \otimes (Y \otimes Z) & & & & (Z \otimes X) \otimes Y \\
& \searrow 1_X \otimes \sigma_{Y,Z} & X \otimes (Z \otimes Y) & \xrightarrow{\alpha_{X,Z,Y}^{-1}} & (X \otimes Z) \otimes Y \\
& & & & \nearrow \sigma_{X,Z} \otimes 1_Y
\end{array} \tag{2}$$