

$$\begin{array}{ccc}
S_2 \times (S_1 \times S_2) & \longrightarrow & [A^2, A] \times ([A, A], \times [A^2, A]) \\
\downarrow & & \downarrow \\
S_3 & \longrightarrow & \text{Hom}(A^3, A)
\end{array}
\qquad
\begin{array}{ccc}
(e_2, e_1, e_2) & \longmapsto & (\mu_2, \text{id}_A, \mu_2) \\
\downarrow & & \downarrow \\
e_3 & \longmapsto & \mu_3 = \mu_2(\text{id}_A, \mu_2)
\end{array}$$