

$$\begin{array}{ccc}
X_n \times (X_{a_1} \times \cdots \times X_{a_n}) & \xrightarrow{(F_n, F_{a_1}, \dots, F_{a_n})} & \text{Hom}(A^n, A) \times (\text{Hom}(A^{a_1}, A) \times \cdots \times \text{Hom}(A^{a_n}, A)) \\
\downarrow \circ_{a_1, \dots, a_n} & & \downarrow \circ'_{a_1, \dots, a_n} \\
X_{a_1 + \cdots + a_n} & \xrightarrow{F_{a_1 + \cdots + a_n}} & \text{Hom}(A^{a_1 + \cdots + a_n}, A)
\end{array}$$