

$$\begin{array}{ccccc}
 \Delta \times \Delta & \xrightarrow{\gamma_\Delta \times \gamma_\Delta} & \mathbf{sSet} \times \mathbf{sSet} & \xrightarrow{\times} & \mathbf{sSet} \\
 \downarrow \oplus & & \swarrow & \nearrow & \\
 \Delta & & \text{sd} & & \\
 \downarrow \gamma_\Delta & & \swarrow & \nearrow & \\
 \mathbf{sSet} & & \text{Sd} & &
 \end{array}$$

The diagram illustrates the relationship between simplicial sets and their geometric realizations. The top row shows the product of two simplicial sets, $\Delta \times \Delta$, mapping via $\gamma_\Delta \times \gamma_\Delta$ to the product of their geometric realizations, $\mathbf{sSet} \times \mathbf{sSet}$, which then maps via the Cartesian product \times to the geometric realization of the product, \mathbf{sSet} . The middle row shows the geometric realization of the product, Δ , mapping via sd to \mathbf{sSet} . The bottom row shows the geometric realization of the product, \mathbf{sSet} , mapping via Sd to \mathbf{sSet} . The vertical arrows represent the geometric realization functors γ_Δ and \oplus .