Notes on Emily Riehl's book ("Categories in Context")

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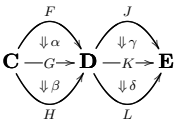
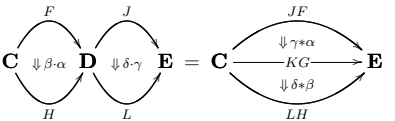
https://anggtwu.net/math-b.html

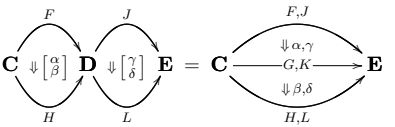
Horizontal and vertical compositions

From [Riehl, p.46]...
In my notation:
an outer $[\cdot]$ stresses that the result is a NT, and
an outer $(\cdot)$ stresses that the result is a functor.

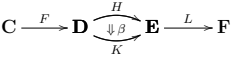




$$(\delta \cdot \gamma) * (\beta \cdot \alpha) = (\delta * \beta) \cdot (\gamma * \alpha)$$

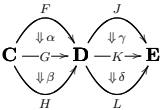


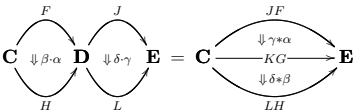
$$\begin{bmatrix}\alpha\\ \beta\end{bmatrix}, \begin{bmatrix}\gamma\\ \delta\end{bmatrix} = \begin{bmatrix}\alpha,\gamma\\ \beta,\delta\end{bmatrix} : (F,J) \overset{\bullet}{\to} (H,L)$$



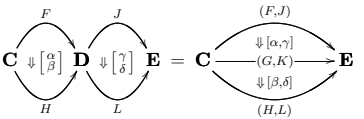
$L\beta F : LHF \Rightarrow LKF$

$[F, \beta, L] : (F, H, L) \overset{\bullet}{\to} (F, K, L)$

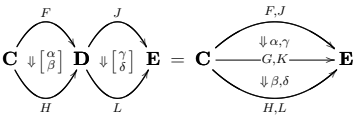




$(\delta \cdot \gamma) * (\beta \cdot \alpha) = (\delta * \beta) \cdot (\gamma * \alpha)$



$[\begin{bmatrix}\alpha\\\beta\end{bmatrix}, \begin{bmatrix}\gamma\\\delta\end{bmatrix}] = \begin{bmatrix}[\alpha,\gamma]\\[\beta,\delta]\end{bmatrix}$



$\begin{bmatrix}\alpha\\\beta\end{bmatrix}, \begin{bmatrix}\gamma\\\delta\end{bmatrix} = \begin{bmatrix}\alpha,\gamma\\\beta,\delta\end{bmatrix}$

Horizontal composition