Diagrammatic Categories in Representation Theory

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Diagrams

Motivation from Representation theory

Talk Overview

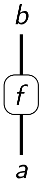
Monoidal Categories

A *monoidal category* is a category with an associative multiplication $\otimes$ for objects and morphisms, and a unit object $\mathbb{1}$, such that the multiplication works well with composition.

Let $\mathcal{C}$ be a monoidal category.

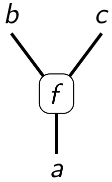
Monoidal Categories

$$f : a \to b$$



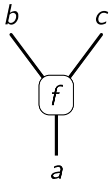
Monoidal Categories

$$f : a \to b \otimes c$$



Monoidal Categories

$$f : a \to b \otimes c$$
$$g : b \otimes c \to a \otimes c$$



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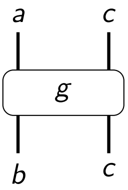
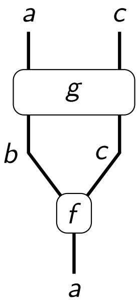


Monoidal Categories

$$f : a \to b \otimes c$$
$$g : b \otimes c \to a \otimes c$$



Monoidal Categories

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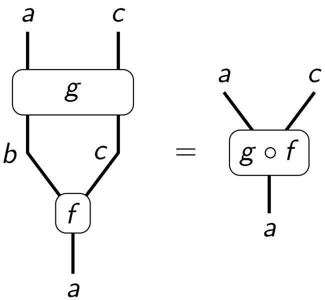


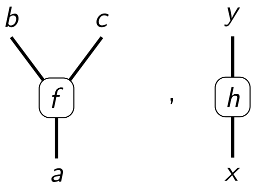
Monoidal Categories

$$\mathrm{id}_a : a \to a$$

$$\begin{tikzcd} a \arrow[d, no head] \\ a \end{tikzcd}$$

Monoidal Categories

$$f : a \to b \otimes c$$
$$h : x \to y$$



Monoidal Categories

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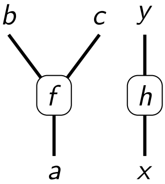

Monoidal Categories

$$f : a \to b \otimes c$$
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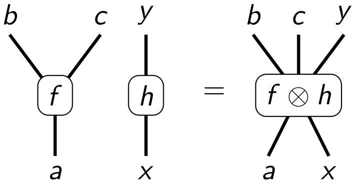
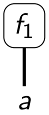


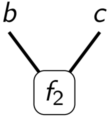
Monoidal Categories

$$f_1 : a \to \mathbb{1}$$



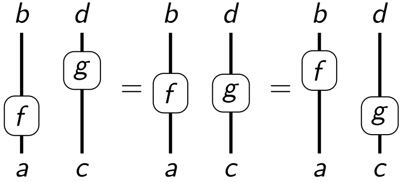
Monoidal Categories

$$f_2 : \mathbb{1} \to b \otimes c$$



Monoidal Categories

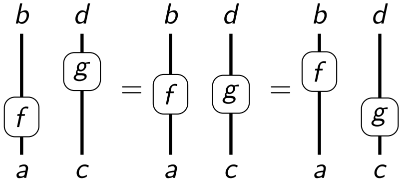
Interchange Law



Frobenius Object

In a monoidal category, a Frobenius object is an object *a* with four maps μ, η, δ and ϵ.

Interchange Law



Diagrammatic Soergel Bimodules

blah blah blah

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