Cautis: Braid Group Actions in Geometry

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Divided powers: $e^{(r)} := e^r/r!$ $\quad f^{(r)} := f^r/r!$

$\dot{U}(sl_2)$ is the $\mathbb{Z}$-submodule of $U(sl_2)$ generated by $e^{(r)}, f^{(r)}$ & h.

Categorical sl_2 actions

Data: Graded additive categories $\mathcal{C}(\lambda)$ with functor

$$E : \mathcal{C}(\lambda) \longrightarrow \mathcal{C}(\lambda+2)$$
$$F : \mathcal{C}(\lambda+2) \longrightarrow \mathcal{C}(\lambda)$$

[also $E^{(r)}$ & $F^{(r)}$]

So that

$$EF|_{\mathcal{C}(\lambda)} \cong FE|_{\mathcal{C}(\lambda)} \oplus Id[\lambda-1] \oplus Id[\lambda-3] \oplus \dots \oplus Id[-\lambda+1]$$

if $\lambda > 0$, & opposite if $\lambda < 0$.

& $E^{(r)} \circ E \cong E^{(r+1)}[-r] \oplus \dots \oplus E^{(r+1)}[+r]$

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