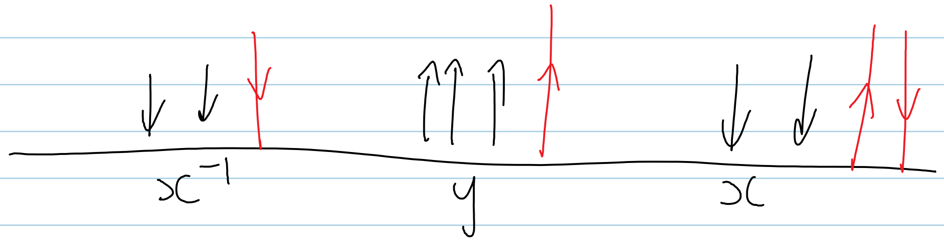
B-Side Operations

September-13-11
8:59 PM



$$\mathcal{D}(S) \cong R \oplus M_{S\times S}(R) \qquad R = \mathbb{Q}[c_i]_{i\in S}$$

$$= \left\{ w + \sum \alpha_{ij} t_i h_j : w, \alpha_{ij} \in R \right\}$$

M
$\cap$

$$\begin{tikzcd}
\mathcal{D}_0(S) \arrow[r, "x"] \arrow[d, "m_z^{xy}"] & \mathcal{A}_0(S) \arrow[d, "m_z^{xy}"] \\
\mathcal{D}_0(S) \arrow[r, "x"] & \mathcal{A}_0(S')
\end{tikzcd}
\qquad
\begin{tikzcd}
\mathcal{D}_0(S) \arrow[r, "x"] \arrow[d, "C_y^x"] & \mathcal{A}_0(S) \arrow[d, "C_y^x"] \\
\mathcal{D}_0(S) \arrow[r, "x"] & \mathcal{A}_0(S)
\end{tikzcd}$$

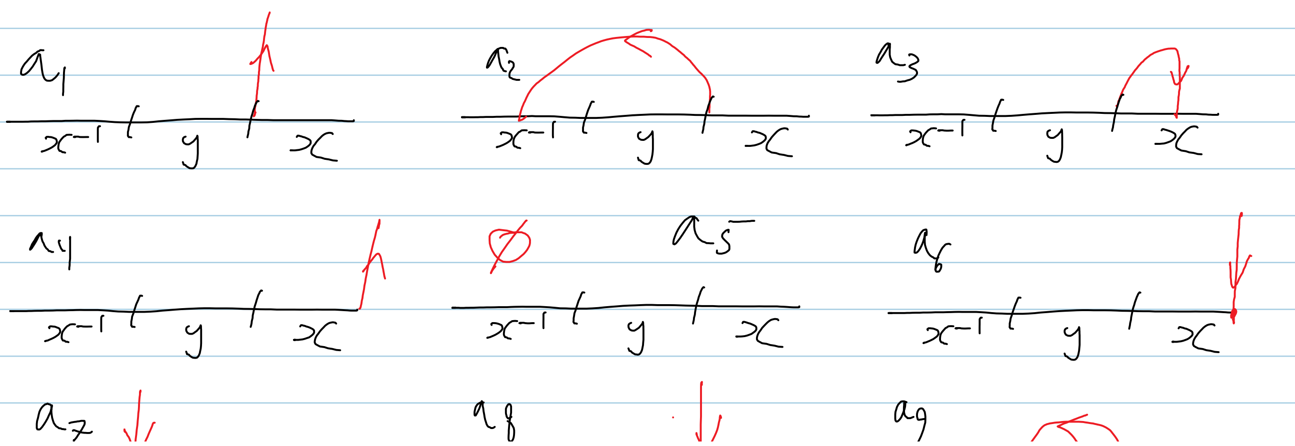
Question. Determine the $\mathcal{D}$-side m_z^{xy} & C_y^x.

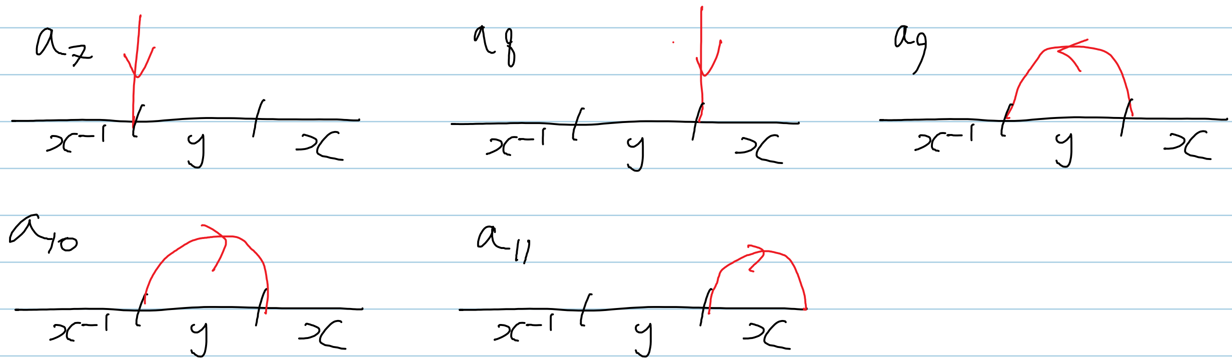
[They are non-linear?]

"one-colour-Euler"

Methodology. Apply the Euler operator E on the $\mathcal{A}$ side; it commutes with m_z^{xy} & C_y^x and it is injective. Extend $\mathcal{D}$ to $\mathcal{D}^E$ so that there would be an Euler operator on the $\mathcal{D}$ side as well.

Long



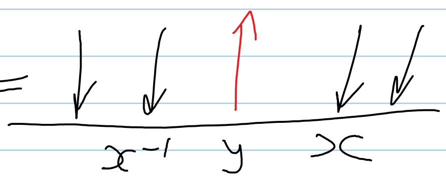


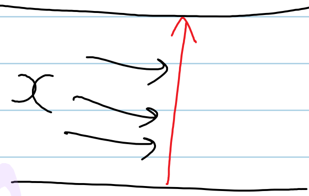
Goal: Write $a_{1,2,3}$ in terms of $a_{4,5,6}$. (a_i must not appear in the end result)

In first pass, with $a_{pq} := t_p h_q$,

$$\mu = \alpha a_{zx} + \beta a_{yz} + \gamma a_{yx}$$

I'm only using "multiplication" here, w/o using specific properties of conjugation. There has to be a better way to go!

$u_1 =$ 

$=$ 

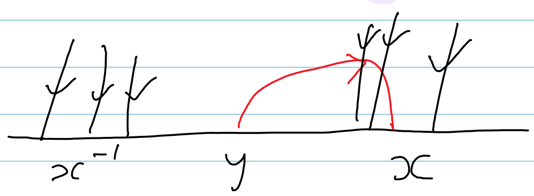
$=$

u for "unknown"

d for "done"

$$= \frac{e^{\alpha c_z + \gamma c_y} - 1}{\alpha c_z + \gamma c_y}\left(\alpha c_y t_z + \gamma c_y u_1\right)$$

$$- e^{\alpha c_z + \gamma c_y} \cdot d$$

$u_2 =$ 

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