$$\frac{1}{(1-a)(1-c)-b^2} = \frac{1}{1-c}\,\frac{1}{1-\left(a+\frac{b^2}{1-c}\right)}$$

$$\frac{1-d}{(1-a)(1-d)-bc} = \frac{1-d}{(1-d)\left(1-\left(a+\frac{bc}{1-d}\right)\right)}$$

$ybax \to byxa$

$1021 \qquad 0\underbrace{11}_{\text{inner}}2$

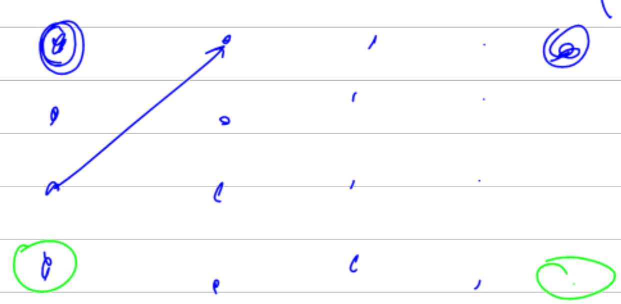
outer

$dxby$

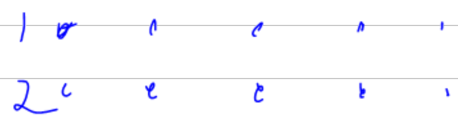
$abyx$

$t = b \pm \epsilon a$

$$(I-A)^{-1} = \sum A^k = E = \begin{pmatrix} e_{11} & & \\ & \ddots & \\ & & \ddots \end{pmatrix}$$



$$A = \begin{pmatrix} a & b \\ c & d \end{pmatrix} \qquad e_{11} = \frac{1-d}{(1-d)(1-a)-bc}$$

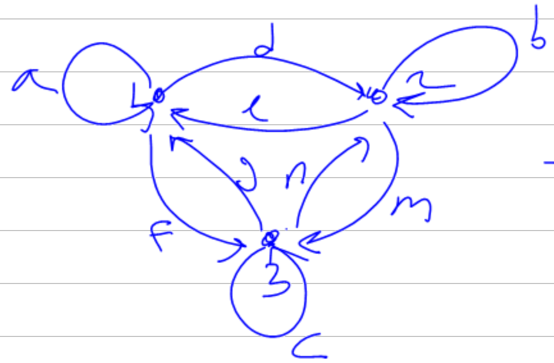


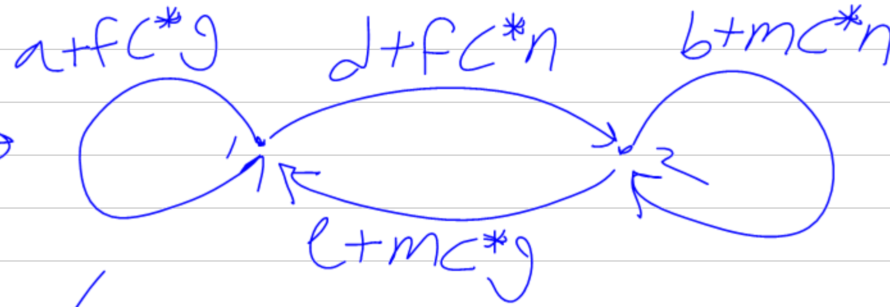

$12112121$

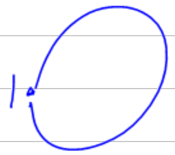
$$11^*(21^*)^*$$

$$\downarrow$$

$$\frac{1}{1-a}$$




$$a+fc^*g+(d+fc^*n)(b+mc^*n)^*(e+mc^*g)$$

$$\mathbf{Simplify}\left[a+f\frac{1}{1-c}g+\left(d+f\frac{1}{1-c}n\right)\frac{1}{1-\underbrace{\left(b+m\frac{1}{1-c}n\right)}}\left(e+m\frac{1}{1-c}g\right) == a+\frac{(1-c)\,d\,e+(1-b)\,f\,g+d\,g\,m+e\,f\,n}{(1-b)\,(1-c)-m\,n}\right]$$

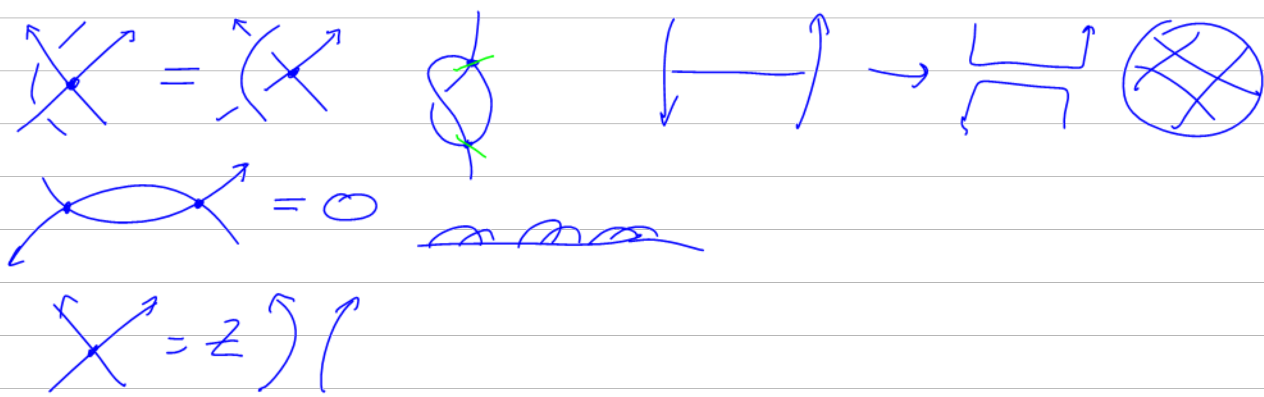
True

$$\frac{1-c}{1-(b+c-bc+mn)}=\frac{1-c}{(1-b)(1-c)-mn}$$

$$\| $$

$$a+(db^*e+fc^*g+db^*mc^*g+fc^*nb^*e)\cdot(mb^*nc^*)^*$$

---



| $\omega$ | $a$ | $b$ | $S$ |
|---|---|---|---|
| $a$ | $\alpha$ | $\beta$ | $\theta$ |
| $b$ | $\gamma$ | $\delta$ | $\epsilon$ |
| $S$ | $\phi$ | $\psi$ | $\Xi$ |

$\xrightarrow[\mu:=1-\beta,\ T_a,T_b\to T_c]{m_c^{ab}}$

| $\mu\omega$ | $c$ | $S$ |
|---|---|---|
| $c$ | $\gamma+\alpha\delta/\mu$ | $\epsilon+\delta\theta/\mu$ |
| $S$ | $\phi+\alpha\psi/\mu$ | $\Xi+\psi\theta/\mu$ |

| $\omega$ | $c$ | $S$ |
|---|---|---|
| $c$ | $\alpha$ | $\theta$ |
| $S$ | $\psi$ | $\Xi$ |

$\xrightarrow[\mu:=1-\alpha]{\Gamma::\mathrm{tr}_c}$

| $\mu\omega$ | $S$ |
|---|---|
| $S$ | $\Xi+\psi\theta/\mu$ |

$\Xi+\psi\theta+\alpha\Xi$

210211a Halacheva: $\mathcal{A}(X) := \bigoplus_k \mathrm{End}(\Lambda^k X)$ is a traced meta monoid with $m_z^{xy}(A) := (z\to \cancel{x}\, y)/\!\!/(e_x/\!\!/i_x/\!\!/A/\!\!/e_y/\!\!/i_y - e_x/\!\!/A/\!\!/i_y)/\!\!/(\cancel{y}\, x\to z)$ and $\mathrm{tr}_x(A) := e_x/\!\!/i_x/\!\!/A/\!\!/e_x/\!\!/i_x - e_x/\!\!/A/\!\!/i_x$. Contains $\Gamma$ (w/ fixed colours) via $\Upsilon$: $(\omega, M)\mapsto \omega\Lambda^*(M\cancel{z})$. Predict $\mathcal{A}$ from $\Gamma$? Interpret $\mathcal{A}$ in *ybax*? Related to super-algebras? Raise $\mathcal{A}$ to meta-Hopf? Understand $\mathrm{im}(\Upsilon)$?

2.

LTR matrix conventions

$$\begin{array}{c|ccc} & x & y & r \\ \hline x & \alpha & \beta & \theta \\ y & \gamma & \delta & \epsilon \\ r & \phi & \psi & \Xi \end{array} \xrightarrow{(z\to y)/\!\!/e_x/\!\!/i_x/\!\!/A/\!\!/e_y/\!\!/i_y/\!\!/x\to z} \begin{array}{c|cc} & z & r \\ \hline z & \gamma & \epsilon \\ r & \phi & \Xi \end{array}$$

$-(z\to y)/\!\!/e_x/\!\!/A/\!\!/i_y/\!\!/x\to z$

$$\begin{array}{c|cc} & z & r \\ \hline z & +\beta\delta & \\ r & & \end{array}$$

| deg | 0 | 1 | 2 |
|---|---|---|---|
| | $w$ | $wM$ | $wM^2$ |

$w \longmapsto w-\beta$

| $\omega$ | $a$ | $b$ | $S$ |
|---|---|---|---|
| $a$ | $\alpha$ | $\beta$ | $\theta$ |
| $b$ | $\gamma$ | $\delta$ | $\epsilon$ |
| $S$ | $\phi$ | $\psi$ | $\Xi$ |

$\xrightarrow[\mu:=1-\beta,\ T_a,T_b\to T_c]{m_c^{ab}}$

| $\mu\omega$ | $c$ | $S$ |
|---|---|---|
| $c$ | $\gamma+\alpha\delta/\mu$ | $\epsilon+\delta\theta/\mu$ |
| $S$ | $\phi+\alpha\psi/\mu$ | $\Xi+\psi\theta/\mu$ |

| $\omega$ | $c$ | $S$ |
|---|---|---|
| $c$ | $\alpha$ | $\theta$ |
| $S$ | $\psi$ | $\Xi$ |

$\xrightarrow[\mu:=1-\alpha]{\Gamma::\mathrm{tr}_c}$

| $\mu\omega$ | $S$ |
|---|---|
| $S$ | $\Xi+\psi\theta/\mu$ |

$$\mu w\cdot(\gamma+\alpha\delta/\mu) = w(\mu\gamma+\alpha\delta)$$
$$= w\left(\left(1-\frac{\beta'}{w}\right)\frac{\gamma'}{w} + \frac{\alpha'\delta'}{w^2}\right) =$$
$$= \frac{1}{w}\left((w-\beta')\gamma' + \alpha'\delta'\right)$$

---

$$e^{\alpha\xi x+\phi\xi y+\theta\eta x+\Xi\eta y}/\!\!/(1+x\xi) = e^{\Xi\eta y}\left(1+(\alpha+\phi\theta y\eta)\right)$$
$$= (1+\alpha)\left(1+\frac{\phi\theta y\eta}{1+\alpha}\right)e^{\Xi\eta y} = (1+\alpha)\,e^{\left(\Xi+\frac{\phi\theta}{1+\alpha}\right)\eta y}$$

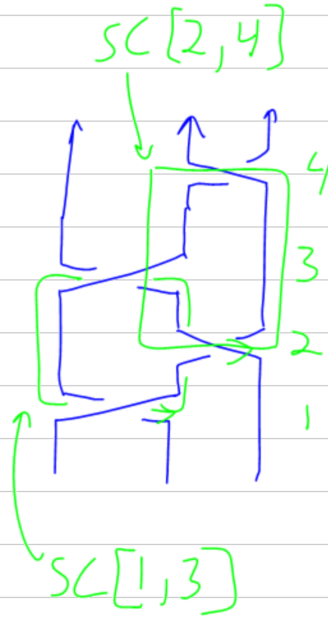
$$e^{\sum a_i x_i} = \prod (1 + a_i x_i)$$

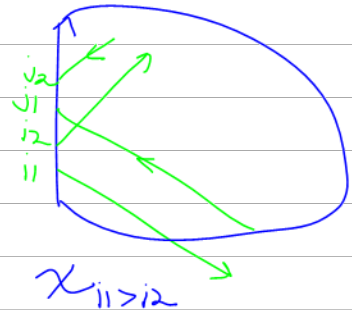
For bosons only!

$$\begin{tikzcd} S(V) \arrow[dr, "\mathrm{lin}"] & \\ V \arrow[u, "\exp"] \arrow[r, "\text{non-lin}"] & W \end{tikzcd}$$

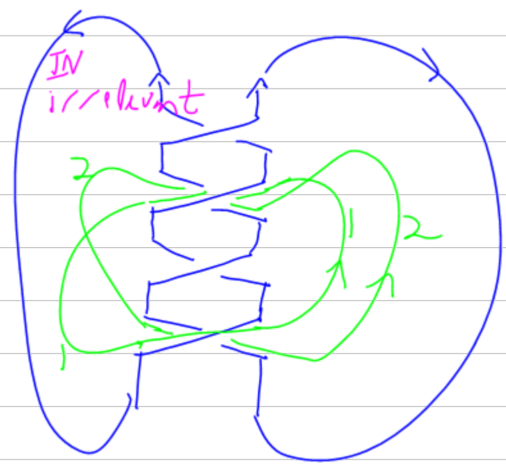
when does it factor through $\sim \Lambda$ ?

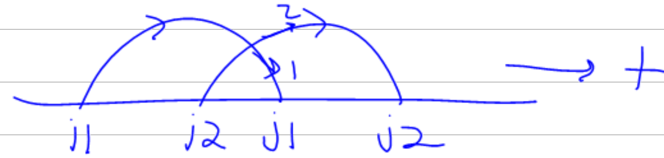
Tristram-Levine Signatures



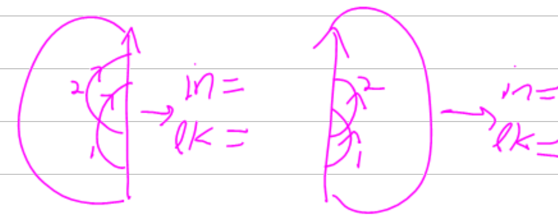




$$lk(a,b^+) = \sum_{x:z(a)>z(b)} sign(x)$$

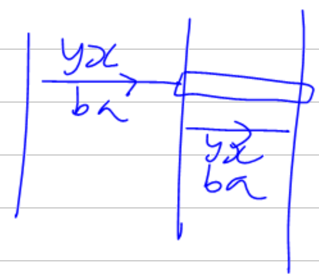



$$IN(i1 \to j1,\ i2 \to j2) = \ldots$$



$[a, x] = x \qquad x^2 = 0$




$ybx$

$\underline{ybx}$

The signature program at

AP/Projects/KnotTheory/Testing/TestingKnotSignature.nb: