Cheat Sheet β on April 7, 2013, 9:11AM

April-08-13
9:36 AM

Consider a verification program.

Cheat Sheet β

http://drorbn.net/AcademicPensieve/2013-03/
initiated 24/3/13; continues 2013-03; modified 7/4/13, 9:11am; completed ?

The original β-calculus: With $\epsilon := 1+\alpha$, $\langle\alpha\rangle := \sum_v \alpha_v$, and $\langle\gamma\rangle := \sum_{v\neq u}\gamma_v$,

$$\begin{array}{c|c} \omega_1 & H_1 \\ \hline T_1 & \alpha_1 \end{array} * \begin{array}{c|c} \omega_2 & H_2 \\ \hline T_2 & \alpha_2 \end{array} =_\beta \begin{array}{c|cc} \omega_1\omega_2 & H_1 & H_2 \\ \hline T_1 & \alpha_1 & 0 \\ T_2 & 0 & \alpha_2 \end{array} \qquad \begin{array}{c|c} \omega & H \\ \hline u & \alpha \\ v & \beta \\ T & \gamma \end{array} \xrightarrow[\beta]{tm^{uv}_w} \begin{array}{c|c} \omega & H \\ \hline w & \alpha+\beta \text{ // } (u,w) \\ T & \gamma \end{array} \qquad R^\pm_{ux} =_\beta \begin{array}{c|c} 1 & x \\ \hline u & t_u^{\pm1}-1 \end{array}$$

A

$$\begin{array}{c|ccc} \omega & x & y & H \\ \hline T & \alpha & \beta & \gamma \end{array} \xrightarrow[\beta]{hm^{xy}_z} \begin{array}{c|cc} \omega & z & H \\ \hline T & \alpha+\beta+\langle\alpha\rangle\beta & \gamma \end{array} \qquad \begin{array}{c|cc} \omega & x & H \\ \hline u & \alpha & \beta \\ T & \gamma & \delta \end{array} \xrightarrow[\beta]{sw^{ux}_{th}} \begin{array}{c|cc} \omega\epsilon & x & H \\ \hline u & \alpha(1+\langle\gamma\rangle/\epsilon) & \beta(1+\langle\gamma\rangle/\epsilon) \\ T & \gamma/\epsilon & \delta-\gamma\beta/\epsilon \end{array}$$

β-better calculus:

$$\begin{array}{c|c} \omega_1 & H_1 \\ \hline T_1 & \alpha_1 \\ - & \sigma_1 \end{array} * \begin{array}{c|c} \omega_2 & H_2 \\ \hline T_2 & \alpha_2 \\ - & \sigma_2 \end{array} =_{\beta_b} \begin{array}{c|cc} \omega_1\omega_2 & H_1 & H_2 \\ \hline T_1 & \omega_2\alpha_1 & 0 \\ T_2 & 0 & \omega_1\alpha_2 \\ - & \sigma_1 & \sigma_2 \end{array} \qquad \begin{array}{c|c} \omega & H \\ \hline u & \alpha \\ v & \beta \\ T & \gamma \\ - & \sigma \end{array} \xrightarrow[\beta_b]{tm^{uv}_w} \begin{array}{c|c} \omega & H \\ \hline w & \alpha+\beta \text{ // } (u,v) \\ T & \gamma \\ - & \sigma \end{array} \qquad R^\pm_{ux} =_{\beta_b} \begin{array}{c|c} 1 & x \\ \hline u & t_u^{\pm1}-1 \\ - & t_u^{\pm1} \end{array}$$

B

$$\begin{array}{c|ccc} \omega & x & y & H \\ \hline T & \alpha & \beta & \gamma \\ - & \sigma_x & \sigma_y & \sigma \end{array} \xrightarrow[\beta_b]{hm^{xy}_z} \begin{array}{c|cc} \omega & z & H \\ \hline T & \alpha+\sigma_x\beta & \gamma \\ - & \sigma_x\sigma_y & \sigma \end{array} \qquad \begin{array}{c|cc} \omega & x & H \\ \hline u & \alpha & \beta \\ T & \gamma & \delta \\ - & \sigma_x & \sigma \end{array} \xrightarrow[\beta_b]{sw^{ux}_{th}} \begin{array}{c|cc} \omega+\alpha & x & H \\ \hline u & \sigma_x\alpha & \sigma_x\beta \\ T & \gamma & \delta+\frac{\alpha\delta-\gamma\beta}{\omega} \end{array}$$

$$= \frac{\omega+\alpha}{\omega}\delta - \frac{\gamma\beta}{\omega}$$

Add dm formulas.
Add Burau calculus

A: constraints: * column sums are monomials minus 1.

B: constraints: * sum of column x is $\sigma_x - 1$.
* $\omega^{k-1} \mid \Lambda^k A$

Put in: Copy of 2012-05/ A Higher Minors Experiment

Claim The condition $\omega^{k-1} \mid \Lambda^k A$ is preserved.

<u>Claim</u> The condition $w^{k-1} \mid \Lambda^k A$ is preserved.

2x2: outer
$$\alpha\delta - \gamma\beta + \alpha\frac{\alpha\delta - \gamma\beta}{w} = (w+\alpha)\frac{\alpha\delta - \gamma\beta}{w}$$

2x2: inner use FOIL: (and FAIL)

$$\left(\frac{w+\alpha}{w}\right)^2 \begin{vmatrix} \delta_{11} & \delta_{12} \\ \delta_{21} & \delta_{22} \end{vmatrix} + \frac{w+\alpha}{w^2}\left(\begin{vmatrix} \delta_{11} & -\gamma_1\beta_2 \\ \delta_{21} & -\gamma_2\beta_2 \end{vmatrix} + \begin{vmatrix} -\gamma_1\beta_1 & \delta_{21} \\ -\gamma_2\beta_1 & \delta_{22} \end{vmatrix} \right)$$

See notes in 2012-05/A Higher Minors Experiment