Pensieve Header: Wheeled Semi-Symmetrized calculus in the 2D quotient: Solving for the “conj” coefficients, IV.

```
SetDirectory["C:\\drorbn\\AcademicPensieve\\Projects\\w-Computations"];
<< "Wheeled Semi-Symmetrized 2D Calculus.m"
```

conj3 works only in the feedback-only case

```
conj3[y_, x_][μ_] := Module[
   {γ},
   γ = Coefficient[μ, ar[y, x]];
   μCollect[μ /. W[ws_] :> W[ws * (c[y] γ + 1)]]
  ];
```

```
μ3 = W[1] + α1 ar[1, 1] + α3 ar[1, 2] + α4 ar[1, 3];
μ3 = W[1] + α1 ar[1, 1] + α2 ar[2, 1] + α3 ar[1, 2] + α4 ar[1, 3];
Riffle[
 ComposeList[
   ops = {conj3[1, 3], conj3[1, 2], hm[2, 3, 2]},
   μ3 = W[1] + α1 ar[1, 1] + α2 ar[2, 1] + α3 ar[1, 2] + α4 ar[1, 3]
  ] // μForm,
 ops
]
```

$$\left\{\begin{pmatrix} W[1] & h[1] & h[2] & h[3] \\ t[1] & \alpha_1 & \alpha_3 & \alpha_4 \\ t[2] & \alpha_2 & 0 & 0 \end{pmatrix}, \text{conj3}[1,3], \begin{pmatrix} W[1+c[1]\,\alpha_4] & h[1] & h[2] & h[3] \\ t[1] & \alpha_1 & \alpha_3 & \alpha_4 \\ t[2] & \alpha_2 & 0 & 0 \end{pmatrix},\right.$$

$$\text{conj3}[1,2], \begin{pmatrix} W[(1+c[1]\,\alpha_3)\,(1+c[1]\,\alpha_4)] & h[1] & h[2] & h[3] \\ t[1] & \alpha_1 & \alpha_3 & \alpha_4 \\ t[2] & \alpha_2 & 0 & 0 \end{pmatrix},$$

$$\left.\text{hm}[2,3,2], \begin{pmatrix} W[(1+c[1]\,\alpha_3)\,(1+c[1]\,\alpha_4)] & h[1] & h[2] \\ t[1] & \alpha_1 & \alpha_4+\alpha_3\,(1+c[1]\,\alpha_4) \\ t[2] & \alpha_2 & 0 \end{pmatrix}\right\}$$

```
Riffle[
 ComposeList[
   ops = {hm[2, 3, 2], conj3[1, 2]},
   μ3
  ] // μForm,
 ops
]
```

$$\left\{\begin{pmatrix} W[1] & h[1] & h[2] & h[3] \\ t[1] & \alpha_1 & \alpha_3 & \alpha_4 \\ t[2] & \alpha_2 & 0 & 0 \end{pmatrix}, \text{hm}[2,3,2], \begin{pmatrix} W[1] & h[1] & h[2] \\ t[1] & \alpha_1 & \alpha_4+\alpha_3\,(1+c[1]\,\alpha_4) \\ t[2] & \alpha_2 & 0 \end{pmatrix},\right.$$

$$\left.\text{conj3}[1,2], \begin{pmatrix} W[(1+c[1]\,\alpha_3)\,(1+c[1]\,\alpha_4)] & h[1] & h[2] \\ t[1] & \alpha_1 & \alpha_4+\alpha_3\,(1+c[1]\,\alpha_4) \\ t[2] & \alpha_2 & 0 \end{pmatrix}\right\}$$

```
(μ2 = W[1] + α ar[1, 1] + β ar[1, 2] + γ ar[2, 1] + δ ar[2, 2]) // μForm
```

$$\begin{pmatrix} W[1] & h[1] & h[2] \\ t[1] & \alpha & \beta \\ t[2] & \gamma & \delta \end{pmatrix}$$

```
μ2 // hfac[2, {1} → 2, 3] // hm[2, 3, 2] // μForm
```

$$\begin{pmatrix} W[1] & h[1] & h[2] \\ t[1] & \alpha & \beta \\ t[2] & \gamma & \delta \end{pmatrix}$$

```
Riffle[
 ComposeList[
   ops = {hfac[2, {1} → 2, 3], conj3[1, 2], conj[1, 3], hm[2, 3, 2]},
   μ2
  ] // μForm,
 ops
]
```

$$\left\{ \begin{pmatrix} W[1] & h[1] & h[2] \\ t[1] & \alpha & \beta \\ t[2] & \gamma & \delta \end{pmatrix}, \text{hfac}[2, \{1\} \to 2, 3], \right.$$

$$\begin{pmatrix} W[1] & h[1] & h[2] & h[3] \\ t[1] & \alpha & \beta & 0 \\ t[2] & \gamma & 0 & \frac{\delta}{1+\beta\, c[1]} \end{pmatrix}, \text{conj3}[1, 2], \begin{pmatrix} W[1+\beta\, c[1]] & h[1] & h[2] & h[3] \\ t[1] & \alpha & \beta & 0 \\ t[2] & \gamma & 0 & \frac{\delta}{1+\beta\, c[1]} \end{pmatrix},$$

$$\text{conj}[1, 3], \begin{pmatrix} W[1+\beta\, c[1]] & h[1] & h[2] & h[3] \\ t[1] & \alpha + \frac{\alpha\,\delta\, c[2]}{1+\beta\, c[1]} & \beta + \frac{\beta\,\delta\, c[2]}{1+\beta\, c[1]} & 0 \\ t[2] & \gamma - \frac{\alpha\,\delta\, c[1]}{1+\beta\, c[1]} & -\frac{\beta\,\delta\, c[1]}{1+\beta\, c[1]} & \frac{\delta}{1+\beta\, c[1]} \end{pmatrix},$$

$$\left. \text{hm}[2, 3, 2], \begin{pmatrix} W[1+\beta\, c[1]] & h[1] & h[2] \\ t[1] & \alpha + \frac{\alpha\,\delta\, c[2]}{1+\beta\, c[1]} & \beta + \frac{\beta\,\delta\, c[2]}{1+\beta\, c[1]} \\ t[2] & \gamma - \frac{\alpha\,\delta\, c[1]}{1+\beta\, c[1]} & \frac{\delta}{1+\beta\, c[1]} \end{pmatrix} \right\}$$