In[13]:=
```
SetDirectory["C:\\drorbn\\AcademicPensieve\\2012-01"];
<< betaCalculus.m
```

In[15]:=
```
{ar[1, 1] ** R[1, 2], R[1, 2] ** ar[1, 1]}
```

Out[15]=
$$\left\{h[1]\,t[1] + \frac{\left(-1+\mathbb{e}^{c[1]}\right) h[2]\,t[1]}{c[1]} + W[1],\ h[1]\,t[1] + \frac{\left(-1+\mathbb{e}^{c[1]}\right) h[2]\,t[1]}{c[1]} + W[1]\right\}$$

In[17]:=
```
(V = W[ω] + α ar[1, 1] + β ar[1, 2] + γ ar[2, 1] + δ ar[2, 2]) // βForm
```

Out[17]//MatrixForm=
$$\begin{pmatrix} W[\omega] & h[1] & h[2] \\ t[1] & \alpha & \beta \\ t[2] & \gamma & \delta \end{pmatrix}$$

In[18]:=
```
Vα = α ar[1, 1]
```

Out[18]=
$$\alpha\, h[1]\, t[1]$$

In[28]:=
```
{Vα ** dΔ[1, 1, 2][R[1, 3]], R[1, 3] ** R[2, 3] ** Vα, Vα ** R[1, 3] ** R[2, 3]} // βForm
```

Out[28]=
$$\left\{\begin{pmatrix} W[1] & h[1] & h[3] \\ t[1] & \alpha & \frac{-1+\mathbb{e}^{c[1]+c[2]}}{c[1]+c[2]} \\ t[2] & 0 & \frac{-1+\mathbb{e}^{c[1]+c[2]}}{c[1]+c[2]} \end{pmatrix}, \begin{pmatrix} W[1] & h[1] & h[3] \\ t[1] & \alpha & \frac{-1+\mathbb{e}^{c[1]}}{c[1]} \\ t[2] & 0 & \frac{\mathbb{e}^{c[1]}\left(-1+\mathbb{e}^{c[2]}\right)}{c[2]} \end{pmatrix}, \begin{pmatrix} W[1] & h[1] & h[3] \\ t[1] & \alpha & \frac{-1+\mathbb{e}^{c[1]}}{c[1]} \\ t[2] & 0 & \frac{\mathbb{e}^{c[1]}\left(-1+\mathbb{e}^{c[2]}\right)}{c[2]} \end{pmatrix}\right\}$$

In[21]:=
```
{t1 = V ** dΔ[1, 1, 2][R[1, 3]], t2 = R[1, 3] ** R[2, 3] ** V} // βForm
```

Out[21]=
$$\left\{\begin{pmatrix} W[\omega] & h[1] & h[2] & h[3] \\ t[1] & \alpha & \beta & \frac{\left(-1+\mathbb{e}^{c[1]+c[2]}\right)\left(1+\alpha\,c[1]+\beta\,c[1]+\alpha\,\beta\,c[1]^2+\beta\,c[2]+\delta\,c[2]+\alpha\,\beta\,c[1]\,c[2]+\alpha\,\delta\,c[1]\,c[2]+\beta\,\gamma\,c[2]^2\right)}{(c[1]+c[2])\,(1+\alpha\,c[1]+\gamma\,c[2])\,(1+\beta\,c[1]+\delta\,c[2])} \\ t[2] & \gamma & \delta & \frac{\left(-1+\mathbb{e}^{c[1]+c[2]}\right)\left(1+\alpha\,c[1]+\gamma\,c[1]+\beta\,\gamma\,c[1]^2+\gamma\,c[2]+\delta\,c[2]+\alpha\,\delta\,c[1]\,c[2]+\gamma\,\delta\,c[1]\,c[2]+\gamma\,\delta\,c[2]^2\right)}{(c[1]+c[2])\,(1+\alpha\,c[1]+\gamma\,c[2])\,(1+\beta\,c[1]+\delta\,c[2])} \end{pmatrix},$$

$$\begin{pmatrix} W[\omega] & h[1] & h[2] & h[3] \\ t[1] & \alpha & \beta & \frac{-1+\mathbb{e}^{c[1]}}{c[1]} \\ t[2] & \gamma & \delta & \frac{\mathbb{e}^{c[1]}\left(-1+\mathbb{e}^{c[2]}\right)}{c[2]} \end{pmatrix}\right\}$$

In[27]:=
```
{t1, t2} /. {β | γ | δ → 0, _W → 0} // βForm
```

Out[27]=
$$\left\{\begin{pmatrix} 0 & h[1] & h[3] \\ t[1] & \alpha & \frac{-1+\mathbb{e}^{c[1]+c[2]}}{c[1]+c[2]} \\ t[2] & 0 & \frac{-1+\mathbb{e}^{c[1]+c[2]}}{c[1]+c[2]} \end{pmatrix}, \begin{pmatrix} 0 & h[1] & h[3] \\ t[1] & \alpha & \frac{-1+\mathbb{e}^{c[1]}}{c[1]} \\ t[2] & 0 & \frac{\mathbb{e}^{c[1]}\left(-1+\mathbb{e}^{c[2]}\right)}{c[2]} \end{pmatrix}\right\}$$