The three basic computations

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9:14 PM

1. Head Multiply

In[8]:=
```
{b = B[ω, α t[1] h[1] + β t[2] h[2]],
 b // hm[1, 2, 1],
 b // J,
 b // J // hm[1, 2, 1],
 b // J // hm[1, 2, 1] // K
}
```

Out[8]=

$$\left\{\begin{pmatrix} \omega & h[1] & h[2] \\ t[1] & \alpha & 0 \\ t[2] & 0 & \beta \end{pmatrix}, \begin{pmatrix} \omega & h[1] \\ t[1] & \alpha \\ t[2] & \beta + \alpha\,\beta\,c_1 \end{pmatrix},\right.$$

$$\left.\begin{pmatrix} \omega & h[1] & h[2] \\ t[1] & \frac{-1+e^{\alpha c_1}}{c_1} & 0 \\ t[2] & 0 & \frac{-1+e^{\beta c_2}}{c_2} \end{pmatrix}, \begin{pmatrix} \omega & h[1] \\ t[1] & \frac{-1+e^{\alpha c_1}}{c_1} \\ t[2] & \frac{e^{\alpha c_1}\left(-1+e^{\beta c_2}\right)}{c_2} \end{pmatrix}, \begin{pmatrix} \omega & h[1] \\ t[1] & \frac{\left(-1+e^{\alpha c_1}\right)\,(\alpha c_1+\beta c_2)}{\left(-1+e^{\alpha c_1+\beta c_2}\right)\,c_1} \\ t[2] & \frac{e^{\alpha c_1}\left(-1+e^{\beta c_2}\right)\,(\alpha c_1+\beta c_2)}{\left(-1+e^{\alpha c_1+\beta c_2}\right)\,c_2} \end{pmatrix}\right\}$$

2. Feedback swap.

In[10]:=
```
{b = B[ω, α t[1] h[1] + β t[1] h[2] + δ t[2] h[2]],
 b // thswap[1, 1],
 b // J // thswap[1, 1] // K
}
```

Out[10]=

$$\left\{\begin{pmatrix} \omega & h[1] & h[2] \\ t[1] & \alpha & \beta \\ t[2] & 0 & \delta \end{pmatrix}, \begin{pmatrix} \omega + \alpha\,\omega\,c_1 & h[1] & h[2] \\ t[1] & \alpha & \beta \\ t[2] & 0 & \delta \end{pmatrix}, \begin{pmatrix} e^{\alpha c_1}\,\omega & h[1] & h[2] \\ t[1] & \alpha & \beta \\ t[2] & 0 & \delta \end{pmatrix}\right\}$$

3. Non-feedback swap.

In[11]:=
```
{b = B[ω, β t[1] h[2] + γ t[2] h[1]],
 b // thswap[1, 1],
 b // J // thswap[1, 1] // K
}
```

Out[11]=

$$\left\{\begin{pmatrix} \omega & h[1] & h[2] \\ t[1] & 0 & \beta \\ t[2] & \gamma & 0 \end{pmatrix}, \begin{pmatrix} \omega & h[1] & h[2] \\ t[1] & 0 & \beta + \beta\,\gamma\,c_2 \\ t[2] & \gamma & -\beta\,\gamma\,c_1 \end{pmatrix}, \begin{pmatrix} \omega & h[1] & h[2] \\ t[1] & 0 & e^{\gamma c_2}\,\beta \\ t[2] & \gamma & -\frac{\left(-1+e^{\gamma c_2}\right)\,\beta\,c_1}{c_2} \end{pmatrix}\right\}$$