

`ocond = FullSimplify[ocond /. {T0 → 0}]`

$$\alpha_{11} + \alpha_{21} + \alpha_{31} + \alpha_{41} == 1 \ \&\& \ \alpha_{12} + \alpha_{22} + \alpha_{32} + \alpha_{42} == 1 \ \&\& \ \alpha_{13} + \alpha_{23} + \alpha_{33} + \alpha_{43} == 1 \ \&\& \ \alpha_{14} + \alpha_{24} + \alpha_{34} + \alpha_{44} == 1$$

`U = Xm[1, u1] Xm[2, u2] Xm[3, u3] Xm[4, u4] // Γ // dm[u1, u2, u] // dm[u, u3, u] // dm[u, u4, u]`

$$\begin{pmatrix} 1 & s_1 & s_2 & s_3 & s_4 & s_u \\ s_1 & 1 & 0 & 0 & 0 & \frac{-1+T_1}{T_1} \\ s_2 & 0 & 1 & 0 & 0 & \frac{-1+T_2}{T_1 T_2} \\ s_3 & 0 & 0 & 1 & 0 & \frac{-1+T_3}{T_1 T_2 T_3} \\ s_4 & 0 & 0 & 0 & 1 & \frac{-1+T_4}{T_1 T_2 T_3 T_4} \\ s_u & 0 & 0 & 0 & 0 & \frac{1}{T_1 T_2 T_3 T_4} \\ \Sigma & 1 & 1 & 1 & 1 & \frac{1}{T_1 T_2 T_3 T_4} \end{pmatrix}$$

`{t1 = U** (γ0 * Γ[e[u]]), t2 = (γ0 * Γ[e[u]]) ** U, ucond = FullSimplify[t1 == t2]}`

$$\left\{ \begin{pmatrix} \omega & s_1 & s_2 & s_3 & s_4 & s_u \\ s_1 & \alpha_{11} & \alpha_{12} & \alpha_{13} & \alpha_{14} & \frac{-T_2 T_3 T_4 \alpha_{11} + T_1 T_2 T_3 T_4 \alpha_{11} - T_3 T_4 \alpha_{12} + T_2 T_3 T_4 \alpha_{12} - T_4 \alpha_{13} + T_3 T_4 \alpha_{13} - \alpha_{14} + T_4 \alpha_{14}}{T_1 T_2 T_3 T_4} \\ s_2 & \alpha_{21} & \alpha_{22} & \alpha_{23} & \alpha_{24} & \frac{-T_2 T_3 T_4 \alpha_{21} + T_1 T_2 T_3 T_4 \alpha_{21} - T_3 T_4 \alpha_{22} + T_2 T_3 T_4 \alpha_{22} - T_4 \alpha_{23} + T_3 T_4 \alpha_{23} - \alpha_{24} + T_4 \alpha_{24}}{T_1 T_2 T_3 T_4} \\ s_3 & \alpha_{31} & \alpha_{32} & \alpha_{33} & \alpha_{34} & \frac{-T_2 T_3 T_4 \alpha_{31} + T_1 T_2 T_3 T_4 \alpha_{31} - T_3 T_4 \alpha_{32} + T_2 T_3 T_4 \alpha_{32} - T_4 \alpha_{33} + T_3 T_4 \alpha_{33} - \alpha_{34} + T_4 \alpha_{34}}{T_1 T_2 T_3 T_4} \\ s_4 & \alpha_{41} & \alpha_{42} & \alpha_{43} & \alpha_{44} & \frac{-T_2 T_3 T_4 \alpha_{41} + T_1 T_2 T_3 T_4 \alpha_{41} - T_3 T_4 \alpha_{42} + T_2 T_3 T_4 \alpha_{42} - T_4 \alpha_{43} + T_3 T_4 \alpha_{43} - \alpha_{44} + T_4 \alpha_{44}}{T_1 T_2 T_3 T_4} \\ s_u & 0 & 0 & 0 & 0 & \frac{1}{T_1 T_2 T_3 T_4} \\ \Sigma & \sigma_1 & \sigma_2 & \sigma_3 & \sigma_4 & \frac{1}{T_1 T_2 T_3 T_4} \end{pmatrix}, \right.$$

$$\left\{ \begin{pmatrix} \omega & s_1 & s_2 & s_3 & s_4 & s_u \\ s_1 & \alpha_{11} & \alpha_{12} & \alpha_{13} & \alpha_{14} & \frac{-1+T_1}{T_1} \\ s_2 & \alpha_{21} & \alpha_{22} & \alpha_{23} & \alpha_{24} & \frac{-1+T_2}{T_1 T_2} \\ s_3 & \alpha_{31} & \alpha_{32} & \alpha_{33} & \alpha_{34} & \frac{-1+T_3}{T_1 T_2 T_3} \\ s_4 & \alpha_{41} & \alpha_{42} & \alpha_{43} & \alpha_{44} & \frac{-1+T_4}{T_1 T_2 T_3 T_4} \\ s_u & 0 & 0 & 0 & 0 & \frac{1}{T_1 T_2 T_3 T_4} \\ \Sigma & \sigma_1 & \sigma_2 & \sigma_3 & \sigma_4 & \frac{1}{T_1 T_2 T_3 T_4} \end{pmatrix}, \right.$$

$$\left. \begin{aligned} & \frac{1}{T_1 T_2 T_3 T_4} (T_4 (T_3 ((-1 + T_1) T_2 (-1 + \alpha_{11}) + (-1 + T_2) \alpha_{12}) + (-1 + T_3) \alpha_{13}) + (-1 + T_4) \alpha_{14}) == 0 \ \&\& \\ & \frac{1}{T_1 T_2 T_3 T_4} (T_4 (-\alpha_{23} + T_3 (1 - \alpha_{22} + T_2 (-1 + (-1 + T_1) \alpha_{21} + \alpha_{22}) + \alpha_{23})) + (-1 + T_4) \alpha_{24}) == 0 \ \&\& \\ & \frac{1}{T_1 T_2 T_3 T_4} (-\alpha_{34} + T_4 (1 - \alpha_{33} + T_3 (-1 - \alpha_{32} + T_2 ((-1 + T_1) \alpha_{31} + \alpha_{32}) + \alpha_{33}) + \alpha_{34})) == 0 \ \&\& \\ & \frac{1}{T_1 T_2 T_3 T_4} (1 - \alpha_{44} + T_4 (-1 - \alpha_{43} + T_3 (-\alpha_{42} + T_2 ((-1 + T_1) \alpha_{41} + \alpha_{42}) + \alpha_{43}) + \alpha_{44})) == 0 \end{aligned} \right\}$$

cert = γ_1 // dm[1, 2, 1] // dm[3, 4, 2]

$$\left(\begin{array}{c} \frac{\omega (\alpha_{14} \alpha_{32} + \alpha_{24} \alpha_{32} - \alpha_{12} \alpha_{34} - \alpha_{22} \alpha_{34} + \alpha_{14} \alpha_{42} + \alpha_{24} \alpha_{42} - \alpha_{12} \alpha_{44} - \alpha_{22} \alpha_{44})}{\sigma_2 \sigma_4} \\ S_1 \\ S_2 \\ \Sigma \end{array} \right) \begin{array}{c} S_1 \\ \frac{\alpha_{14} \alpha_{31} + \alpha_{24} \alpha_{31} - \alpha_{11} \alpha_{34} - \alpha_{21} \alpha_{34} + \alpha_{14} \alpha_{41} + \alpha_{24} \alpha_{41} - \alpha_{11} \alpha_{44} - \alpha_{21} \alpha_{44}}{\alpha_{14} \alpha_{32} + \alpha_{24} \alpha_{32} - \alpha_{12} \alpha_{34} - \alpha_{22} \alpha_{34} + \alpha_{14} \alpha_{42} + \alpha_{24} \alpha_{42} - \alpha_{12} \alpha_{44} - \alpha_{22} \alpha_{44}} \frac{\alpha_{14} \alpha_{41}}{\alpha_{14} \alpha_{41}} \\ \frac{\alpha_{12} \alpha_{31} + \alpha_{22} \alpha_{31} - \alpha_{11} \alpha_{32} - \alpha_{21} \alpha_{32} + \alpha_{12} \alpha_{41} + \alpha_{22} \alpha_{41} - \alpha_{11} \alpha_{42} - \alpha_{21} \alpha_{42}}{-\alpha_{14} \alpha_{32} - \alpha_{24} \alpha_{32} + \alpha_{12} \alpha_{34} + \alpha_{22} \alpha_{34} - \alpha_{14} \alpha_{42} - \alpha_{24} \alpha_{42} + \alpha_{12} \alpha_{44} + \alpha_{22} \alpha_{44}} \frac{\alpha_{13} \alpha_{41}}{\alpha_{14} \alpha_{41}} \\ \frac{\sigma_1}{\sigma_2} \end{array}$$

eqns = ($\epsilon[1] \epsilon[2]$ // Γ) == (cert /. $\sigma \rightarrow 1$) // Simplify

$$\begin{aligned} & -\omega (\alpha_{14} (\alpha_{32} + \alpha_{42}) + \alpha_{24} (\alpha_{32} + \alpha_{42}) - (\alpha_{12} + \alpha_{22}) (\alpha_{34} + \alpha_{44})) = 1 \ \&\& \\ & \frac{\alpha_{14} (\alpha_{31} + \alpha_{41}) + \alpha_{24} (\alpha_{31} + \alpha_{41}) - (\alpha_{11} + \alpha_{21}) (\alpha_{34} + \alpha_{44})}{\alpha_{14} (\alpha_{32} + \alpha_{42}) + \alpha_{24} (\alpha_{32} + \alpha_{42}) - (\alpha_{12} + \alpha_{22}) (\alpha_{34} + \alpha_{44})} = 1 \ \&\& \\ & \frac{\alpha_{14} (\alpha_{33} + \alpha_{43}) + \alpha_{24} (\alpha_{33} + \alpha_{43}) - (\alpha_{13} + \alpha_{23}) (\alpha_{34} + \alpha_{44})}{\alpha_{14} (\alpha_{32} + \alpha_{42}) + \alpha_{24} (\alpha_{32} + \alpha_{42}) - (\alpha_{12} + \alpha_{22}) (\alpha_{34} + \alpha_{44})} = 0 \ \&\& \\ & \frac{\alpha_{12} (\alpha_{31} + \alpha_{41}) + \alpha_{22} (\alpha_{31} + \alpha_{41}) - (\alpha_{11} + \alpha_{21}) (\alpha_{32} + \alpha_{42})}{-\alpha_{14} (\alpha_{32} + \alpha_{42}) - \alpha_{24} (\alpha_{32} + \alpha_{42}) + (\alpha_{12} + \alpha_{22}) (\alpha_{34} + \alpha_{44})} = 0 \ \&\& \\ & \frac{\alpha_{13} (\alpha_{32} + \alpha_{42}) + \alpha_{23} (\alpha_{32} + \alpha_{42}) - (\alpha_{12} + \alpha_{22}) (\alpha_{33} + \alpha_{43})}{\alpha_{14} (\alpha_{32} + \alpha_{42}) + \alpha_{24} (\alpha_{32} + \alpha_{42}) - (\alpha_{12} + \alpha_{22}) (\alpha_{34} + \alpha_{44})} = 1 \end{aligned}$$

alex = (γ_1 // dm[4, 3, 3] // dm[3, 2, 2] // dm[2, 1, 1]) [[1]]

$$\frac{1}{\sigma_2 \sigma_4} \omega (\alpha_{23} \alpha_{41} - \alpha_{24} \alpha_{41} + \alpha_{33} \alpha_{41} - \alpha_{34} \alpha_{41} - \alpha_{23} \alpha_{42} + \alpha_{24} \alpha_{42} - \alpha_{33} \alpha_{42} + \alpha_{34} \alpha_{42} - \alpha_{21} \alpha_{43} + \alpha_{22} \alpha_{43} - \alpha_{31} \alpha_{43} + \alpha_{32} \alpha_{43} + \alpha_{21} \alpha_{44} - \alpha_{22} \alpha_{44} + \alpha_{31} \alpha_{44} - \alpha_{32} \alpha_{44})$$

FullSimplify[alex, eqns && ucond && ocond]

$$\frac{\omega (- (\alpha_{23} - \alpha_{24}) (\alpha_{41} - \alpha_{42}) + (\alpha_{21} - \alpha_{22}) (\alpha_{43} - \alpha_{44}))}{\sigma_2 \sigma_4}$$

FullSimplify[cert[[1]]]

$$\frac{\omega (- (\alpha_{14} + \alpha_{24}) (\alpha_{32} + \alpha_{42}) + (\alpha_{12} + \alpha_{22}) (\alpha_{34} + \alpha_{44}))}{\sigma_2 \sigma_4}$$