

Proof of Proposition 3.11:

ln[]:=* (*We establish the multiplication for SW. We
 set the variable l to be sw. The bar denotes inverse. *)
 vars = {s, w, l};
 m_{i,j→k}[Z_] := Expand[Z] /. {s_i s_j → 1, w_i w_j → 0, s_i w_j → l_k, w_i s_j → -l_k, l_i s_j → -w_k, s_i l_j → w_k,
 l_i w_j → 0, w_i l_j → 0, l_i l_j → 0, x_{-i} /; MemberQ[vars, x] ⇒ x_k, x_{-j} /; MemberQ[vars, x] ⇒ x_{k}}}

ln[]:=* (* We start by declaring the elements R and κ: *)
 κ_i := λ₁ + λ₂ s_i + λ₃ w_i + λ₄ l_i;
 κ̄_i := λ̄₁ + λ̄₂ s_i + λ̄₃ w_i + λ̄₄ l_i;
 R_{i,j} := μ_{1,1} + μ_{1,2} s_i + μ_{1,3} w_i + μ_{1,4} l_i + μ_{2,1} s_j + μ_{2,2} s_i s_j + μ_{2,3} w_i s_j + μ_{2,4} l_i s_j +
 μ_{3,1} w_j + μ_{3,2} s_i w_j + μ_{3,3} w_i w_j + μ_{3,4} l_i w_j + μ_{4,1} l_j + μ_{4,2} s_i l_j + μ_{4,3} w_i l_j + μ_{4,4} l_i l_j
 R̄_{i,j} := μ̄_{1,1} + μ̄_{1,2} s_i + μ̄_{1,3} w_i + μ̄_{1,4} l_i + μ̄_{2,1} s_j + μ̄_{2,2} s_i s_j + μ̄_{2,3} w_i s_j + μ̄_{2,4} l_i s_j +
 μ̄_{3,1} w_j + μ̄_{3,2} s_i w_j + μ̄_{3,3} w_i w_j + μ̄_{3,4} l_i w_j + μ̄_{4,1} l_j + μ̄_{4,2} s_i l_j + μ̄_{4,3} w_i l_j + μ̄_{4,4} l_i l_j
 (*We also implement the element v :*)
 v_i := R_{1,3} κ̄₂ // m_{1,2→1} // m_{1,3→i}
 v̄_i := R̄_{3,1} κ̄₂ // m_{1,2→1} // m_{1,3→i}

ln[]:=* (*By the previous lemma, we simply set the values of the bar variables: *)

$$\{\bar{\lambda}_1, \bar{\lambda}_2, \bar{\lambda}_3, \bar{\lambda}_4\} = \left\{ \frac{\lambda_1}{\lambda_1^2 - \lambda_2^2}, -\frac{\lambda_2}{\lambda_1^2 - \lambda_2^2}, -\frac{\lambda_3}{\lambda_1^2 - \lambda_2^2}, -\frac{\lambda_4}{\lambda_1^2 - \lambda_2^2} \right\};$$

 rulesRinv =

$$\begin{aligned} \bar{\mu}_{1,1} &\rightarrow -\left((-\mu_{1,1}^3 + \mu_{1,1} \mu_{1,2}^2 + \mu_{1,1} \mu_{2,1}^2 - 2 \mu_{1,2} \mu_{2,1} \mu_{2,2} + \mu_{1,1} \mu_{2,2}^2) / (\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - 2 \mu_{1,1}^2 \mu_{2,1}^2 - \right. \\ &\quad \left. 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4) \right), \\ \bar{\mu}_{1,2} &\rightarrow -\left((\mu_{1,1}^2 \mu_{1,2} - \mu_{1,2}^3 + \mu_{1,2} \mu_{2,1}^2 - 2 \mu_{1,1} \mu_{2,1} \mu_{2,2} + \mu_{1,2} \mu_{2,2}^2) / (\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - \right. \\ &\quad \left. 2 \mu_{1,1}^2 \mu_{2,1}^2 - 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4) \right), \\ \bar{\mu}_{1,3} &\rightarrow -\left((\mu_{1,1}^2 \mu_{1,3} - \mu_{1,2}^2 \mu_{1,3} + \mu_{1,3} \mu_{2,1}^2 - \mu_{1,3} \mu_{2,2}^2 - 2 \mu_{1,1} \mu_{2,1} \mu_{2,3} + 2 \mu_{1,2} \mu_{2,2} \mu_{2,3}) / \right. \\ &\quad \left(\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - 2 \mu_{1,1}^2 \mu_{2,1}^2 - 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + \right. \\ &\quad \left. 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4) \right), \bar{\mu}_{1,4} \rightarrow \\ &\quad -\left((\mu_{1,1}^2 \mu_{1,4} - \mu_{1,2}^2 \mu_{1,4} + \mu_{1,4} \mu_{2,1}^2 - \mu_{1,4} \mu_{2,2}^2 - 2 \mu_{1,1} \mu_{2,1} \mu_{2,4} + 2 \mu_{1,2} \mu_{2,2} \mu_{2,4}) / (\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - \right. \\ &\quad \left. 2 \mu_{1,1}^2 \mu_{2,1}^2 - 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4) \right), \\ \bar{\mu}_{2,1} &\rightarrow -\left((\mu_{1,1}^2 \mu_{2,1} + \mu_{1,2}^2 \mu_{2,1} - \mu_{2,1}^3 - 2 \mu_{1,1} \mu_{1,2} \mu_{2,2} + \mu_{2,1} \mu_{2,2}^2) / (\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - \right. \\ &\quad \left. 2 \mu_{1,1}^2 \mu_{2,1}^2 - 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4) \right), \\ \bar{\mu}_{2,2} &\rightarrow -\left((-2 \mu_{1,1} \mu_{1,2} \mu_{2,1} + \mu_{1,1}^2 \mu_{2,2} + \mu_{1,2}^2 \mu_{2,2} + \mu_{2,1}^2 \mu_{2,2} - \mu_{2,2}^3) / (\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - \right. \\ &\quad \left. 2 \mu_{1,1}^2 \mu_{2,1}^2 - 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4) \right), \\ \bar{\mu}_{2,3} &\rightarrow -\left((-2 \mu_{1,1} \mu_{1,3} \mu_{2,1} + 2 \mu_{1,2} \mu_{1,3} \mu_{2,2} + \mu_{1,1}^2 \mu_{2,3} - \mu_{1,2}^2 \mu_{2,3} + \mu_{2,1}^2 \mu_{2,3} - \mu_{2,2}^2 \mu_{2,3}) / \right. \\ &\quad \left(\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - 2 \mu_{1,1}^2 \mu_{2,1}^2 - 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + \right. \\ &\quad \left. 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4) \right), \bar{\mu}_{2,4} \rightarrow \\ &\quad -\left((-2 \mu_{1,1} \mu_{1,4} \mu_{2,1} + 2 \mu_{1,2} \mu_{1,4} \mu_{2,2} + \mu_{1,1}^2 \mu_{2,4} - \mu_{1,2}^2 \mu_{2,4} + \mu_{2,1}^2 \mu_{2,4} - \mu_{2,2}^2 \mu_{2,4}) / (\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - \right. \\ &\quad \left. 2 \mu_{1,1}^2 \mu_{2,1}^2 - 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4) \right), \\ \bar{\mu}_{3,1} &\rightarrow -\left((\mu_{1,1}^2 \mu_{3,1} + \mu_{1,2}^2 \mu_{3,1} - \mu_{2,1}^2 \mu_{3,1} - \mu_{2,2}^2 \mu_{3,1} - 2 \mu_{1,1} \mu_{1,2} \mu_{3,2} + 2 \mu_{2,1} \mu_{2,2} \mu_{3,2}) / \right. \end{aligned}$$

$$\begin{aligned}
& \left(\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - 2 \mu_{1,1}^2 \mu_{2,1}^2 - 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + \right. \\
& \quad \left. 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4 \right), \bar{\mu}_{3,2} \rightarrow \\
& - \left(-2 \mu_{1,1} \mu_{1,2} \mu_{3,1} + 2 \mu_{2,1} \mu_{2,2} \mu_{3,1} + \mu_{1,1}^2 \mu_{3,2} + \mu_{1,2}^2 \mu_{3,2} - \mu_{2,1}^2 \mu_{3,2} - \mu_{2,2}^2 \mu_{3,2} \right) / \left(\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - \right. \\
& \quad \left. 2 \mu_{1,1}^2 \mu_{2,1}^2 - 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4 \right), \\
& \bar{\mu}_{3,3} \rightarrow - \left(-2 \mu_{1,1} \mu_{1,3} \mu_{3,1} + 2 \mu_{2,1} \mu_{2,3} \mu_{3,1} + 2 \mu_{1,2} \mu_{1,3} \mu_{3,2} - 2 \mu_{2,2} \mu_{2,3} \mu_{3,2} + \mu_{1,1}^2 \mu_{3,3} - \right. \\
& \quad \mu_{1,2}^2 \mu_{3,3} - \mu_{2,1}^2 \mu_{3,3} + \mu_{2,2}^2 \mu_{3,3} + 2 \mu_{1,4} \mu_{2,2} \mu_{4,1} - 2 \mu_{1,2} \mu_{2,4} \mu_{4,1} - 2 \mu_{1,4} \mu_{2,1} \mu_{4,2} + \\
& \quad \left. 2 \mu_{1,1} \mu_{2,4} \mu_{4,2} + 2 \mu_{1,2} \mu_{2,1} \mu_{4,4} - 2 \mu_{1,1} \mu_{2,2} \mu_{4,4} \right) / \left(\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - 2 \mu_{1,1}^2 \mu_{2,1}^2 - \right. \\
& \quad \left. 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4 \right), \\
& \bar{\mu}_{3,4} \rightarrow - \left(-2 \mu_{1,1} \mu_{1,4} \mu_{3,1} + 2 \mu_{2,1} \mu_{2,4} \mu_{3,1} + 2 \mu_{1,2} \mu_{1,4} \mu_{3,2} - 2 \mu_{2,2} \mu_{2,4} \mu_{3,2} + \mu_{1,1}^2 \mu_{3,4} - \right. \\
& \quad \mu_{1,2}^2 \mu_{3,4} - \mu_{2,1}^2 \mu_{3,4} + \mu_{2,2}^2 \mu_{3,4} + 2 \mu_{1,3} \mu_{2,2} \mu_{4,1} - 2 \mu_{1,2} \mu_{2,3} \mu_{4,1} - 2 \mu_{1,3} \mu_{2,1} \mu_{4,2} + \\
& \quad \left. 2 \mu_{1,1} \mu_{2,3} \mu_{4,2} + 2 \mu_{1,2} \mu_{2,1} \mu_{4,3} - 2 \mu_{1,1} \mu_{2,2} \mu_{4,3} \right) / \left(\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - 2 \mu_{1,1}^2 \mu_{2,1}^2 - \right. \\
& \quad \left. 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4 \right), \\
& \bar{\mu}_{4,1} \rightarrow - \left(\mu_{1,1}^2 \mu_{4,1} + \mu_{1,2}^2 \mu_{4,1} - \mu_{2,1}^2 \mu_{4,1} - \mu_{2,2}^2 \mu_{4,1} - 2 \mu_{1,1} \mu_{1,2} \mu_{4,2} + 2 \mu_{2,1} \mu_{2,2} \mu_{4,2} \right) / \\
& \quad \left(\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - 2 \mu_{1,1}^2 \mu_{2,1}^2 - 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + \right. \\
& \quad \left. 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4 \right), \bar{\mu}_{4,2} \rightarrow \\
& - \left(-2 \mu_{1,1} \mu_{1,2} \mu_{4,1} + 2 \mu_{2,1} \mu_{2,2} \mu_{4,1} + \mu_{1,1}^2 \mu_{4,2} + \mu_{1,2}^2 \mu_{4,2} - \mu_{2,1}^2 \mu_{4,2} - \mu_{2,2}^2 \mu_{4,2} \right) / \left(\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - \right. \\
& \quad \left. 2 \mu_{1,1}^2 \mu_{2,1}^2 - 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4 \right), \\
& \bar{\mu}_{4,3} \rightarrow - \left(2 \mu_{1,4} \mu_{2,2} \mu_{3,1} - 2 \mu_{1,2} \mu_{2,4} \mu_{3,1} - 2 \mu_{1,4} \mu_{2,1} \mu_{3,2} + 2 \mu_{1,1} \mu_{2,4} \mu_{3,2} + 2 \mu_{1,2} \mu_{2,1} \mu_{3,4} - \right. \\
& \quad \left. 2 \mu_{1,1} \mu_{2,2} \mu_{3,4} - 2 \mu_{1,1} \mu_{1,3} \mu_{4,1} + 2 \mu_{2,1} \mu_{2,3} \mu_{4,1} + 2 \mu_{1,2} \mu_{1,3} \mu_{4,2} - 2 \mu_{2,2} \mu_{2,3} \mu_{4,2} + \right. \\
& \quad \left. \mu_{1,1}^2 \mu_{4,3} - \mu_{1,2}^2 \mu_{4,3} - \mu_{2,1}^2 \mu_{4,3} + \mu_{2,2}^2 \mu_{4,3} \right) / \left(\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - 2 \mu_{1,1}^2 \mu_{2,1}^2 - \right. \\
& \quad \left. 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4 \right), \\
& \bar{\mu}_{4,4} \rightarrow - \left(2 \mu_{1,3} \mu_{2,2} \mu_{3,1} - 2 \mu_{1,2} \mu_{2,3} \mu_{3,1} - 2 \mu_{1,3} \mu_{2,1} \mu_{3,2} + 2 \mu_{1,1} \mu_{2,3} \mu_{3,2} + 2 \mu_{1,2} \mu_{2,1} \mu_{3,3} - \right. \\
& \quad \left. 2 \mu_{1,1} \mu_{2,2} \mu_{3,3} - 2 \mu_{1,1} \mu_{1,4} \mu_{4,1} + 2 \mu_{2,1} \mu_{2,4} \mu_{4,1} + 2 \mu_{1,2} \mu_{1,4} \mu_{4,2} - 2 \mu_{2,2} \mu_{2,4} \mu_{4,2} + \right. \\
& \quad \left. \mu_{1,1}^2 \mu_{4,4} - \mu_{1,2}^2 \mu_{4,4} - \mu_{2,1}^2 \mu_{4,4} + \mu_{2,2}^2 \mu_{4,4} \right) / \left(\mu_{1,1}^4 - 2 \mu_{1,1}^2 \mu_{1,2}^2 + \mu_{1,2}^4 - 2 \mu_{1,1}^2 \mu_{2,1}^2 - \right. \\
& \quad \left. 2 \mu_{1,2}^2 \mu_{2,1}^2 + \mu_{2,1}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} - 2 \mu_{1,1}^2 \mu_{2,2}^2 - 2 \mu_{1,2}^2 \mu_{2,2}^2 - 2 \mu_{2,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4 \right);
\end{aligned}$$

Scan[Set @@ # &, rulesRinv]

In[*]:=

$$\begin{aligned}
A = & \left\{ 2 \lambda_2 (\mu_{2,4} - \mu_{4,2}), -2 \lambda_2 (\mu_{2,3} - \mu_{3,2}), -2 \lambda_1 \lambda_2 (-2 \lambda_3 \mu_{4,2} + \lambda_2 (\mu_{3,4} + \mu_{4,3})), -2 \lambda_2^2 (\mu_{3,2} \mu_{4,1} - \mu_{3,1} \mu_{4,2}), \right. \\
& -2 \lambda_2 (\mu_{2,2} \mu_{4,1} - \mu_{2,1} \mu_{4,2}), -2 \lambda_1 \lambda_2^2 (-2 \mu_{3,2} \mu_{4,2} + \mu_{2,2} (\mu_{3,4} + \mu_{4,3})), 2 \lambda_1 \lambda_2^2 (-2 \mu_{3,1} \mu_{4,2} + \mu_{2,1} (\mu_{3,4} + \mu_{4,3})), \\
& 2 \lambda_1 \lambda_2^2 (-2 \mu_{1,3} \mu_{4,2} + \mu_{1,2} (\mu_{3,4} + \mu_{4,3})), -4 \lambda_1^2 \lambda_2^2 (\mu_{3,2}^2 + \mu_{4,2}^2 - \mu_{2,2} (\mu_{3,3} + \mu_{4,4})), \\
& -4 \lambda_1^2 \lambda_2^2 (\mu_{3,1} \mu_{3,2} + \mu_{4,1} \mu_{4,2} - \mu_{2,1} (\mu_{3,3} + \mu_{4,4})), -2 \lambda_2^2 (\mu_{1,4} \mu_{3,2} - \mu_{1,3} \mu_{4,2}), \\
& -4 \lambda_1^2 \lambda_2^2 (\mu_{1,3} \mu_{3,2} + \mu_{1,4} \mu_{4,2} - \mu_{1,2} (\mu_{3,3} + \mu_{4,4})), -2 \lambda_1 \lambda_2 (-2 \lambda_4 \mu_{3,2} + \lambda_2 (\mu_{3,4} + \mu_{4,3})), \\
& 4 \lambda_1^2 \lambda_2 (\lambda_3 \mu_{3,2} + \lambda_4 \mu_{4,2} - \lambda_2 (\mu_{3,3} + \mu_{4,4})), -2 \lambda_2 (\mu_{2,2} \mu_{3,1} - \mu_{2,1} \mu_{3,2}), -2 \lambda_2^2 (\mu_{1,4} \mu_{3,1} - \mu_{1,3} \mu_{4,1}), \\
& -2 \lambda_2 (\lambda_4 \mu_{3,1} - \lambda_3 \mu_{4,1}), -2 \lambda_2 (\mu_{1,4} \mu_{2,2} - \mu_{1,2} \mu_{4,2}), -2 \lambda_2 (\mu_{1,3} \mu_{2,2} - \mu_{1,2} \mu_{3,2}), \\
& 2 \lambda_4 \mu_{2,2} - 2 \lambda_2 \mu_{4,2}, 2 \lambda_3 \mu_{2,2} - 2 \lambda_2 \mu_{3,2}, -2 \lambda_2 (\mu_{1,4} \mu_{2,1} - \mu_{1,2} \mu_{4,1}), -2 \lambda_2 (\mu_{1,3} \mu_{2,1} - \mu_{1,2} \mu_{3,1}), \\
& 2 \lambda_4 \mu_{2,1} - 2 \lambda_2 \mu_{4,1}, -2 \lambda_3 \mu_{2,1} + 2 \lambda_2 \mu_{3,1}, -2 \lambda_2 (\lambda_4 \mu_{1,3} - \lambda_3 \mu_{1,4}), 2 \lambda_4 \mu_{1,2} - 2 \lambda_2 \mu_{1,4}, \\
& -2 \lambda_3 \mu_{1,2} + 2 \lambda_2 \mu_{1,3}, -2 \lambda_1^2 \lambda_2 (2 \lambda_4 \mu_{4,2}^2 + \lambda_2 (\mu_{3,2} (\mu_{3,4} + \mu_{4,3}) - 2 \mu_{4,2} (\mu_{3,3} + \mu_{4,4}))), \\
& 2 \lambda_1^2 \lambda_2 (2 \lambda_4 \mu_{4,1} \mu_{4,2} + \lambda_2 (\mu_{3,1} (\mu_{3,4} + \mu_{4,3}) - 2 \mu_{4,1} (\mu_{3,3} + \mu_{4,4}))), \\
& 2 \lambda_1^2 \lambda_2 (2 \lambda_4 \mu_{1,4} \mu_{4,2} + \lambda_2 (\mu_{1,3} (\mu_{3,4} + \mu_{4,3}) - 2 \mu_{1,4} (\mu_{3,3} + \mu_{4,4}))), \\
& -2 \lambda_1^2 \lambda_2 (2 \lambda_4^2 \mu_{4,2} + \lambda_2 (\lambda_3 (\mu_{3,4} + \mu_{4,3}) - 2 \lambda_4 (\mu_{3,3} + \mu_{4,4}))), 4 \lambda_1^2 \lambda_2^2 \\
& \left(-((\mu_{3,1}^2 + \mu_{4,1}^2) \mu_{4,2}) + \mu_{2,1} \mu_{4,1} (\mu_{3,3} + \mu_{4,4}) \right), 4 \lambda_1^2 \lambda_2^2 \left(-((\mu_{1,3} \mu_{3,1} + \mu_{1,4} \mu_{4,1}) \mu_{4,2}) + \mu_{1,2} \mu_{4,1} (\mu_{3,3} + \mu_{4,4}) \right), \\
& -2 \lambda_1^2 \lambda_2^2 (\mu_{3,1}^2 (\mu_{3,4} + \mu_{4,3}) + \mu_{4,1}^2 (\mu_{3,4} + \mu_{4,3}) - 2 \mu_{3,1} \mu_{4,1} (\mu_{3,3} + \mu_{4,4})), \\
& 2 \lambda_1^2 \lambda_2^4 (\mu_{1,4} \mu_{4,1} (\mu_{3,4} + \mu_{4,3}) + \mu_{1,3} (\mu_{3,1} (\mu_{3,4} + \mu_{4,3}) - 2 \mu_{4,1} (\mu_{3,3} + \mu_{4,4}))), \\
& 2 \lambda_1^2 \lambda_2^3 (\lambda_4 \mu_{4,1} (\mu_{3,4} + \mu_{4,3}) + \lambda_3 (\mu_{3,1} (\mu_{3,4} + \mu_{4,3}) - 2 \mu_{4,1} (\mu_{3,3} + \mu_{4,4}))), \\
& 2 \lambda_1^2 \lambda_2^3 (\mu_{1,3}^2 (\mu_{3,4} + \mu_{4,3}) + \mu_{1,4}^2 (\mu_{3,4} + \mu_{4,3}) - 2 \mu_{1,3} \mu_{1,4} (\mu_{3,3} + \mu_{4,4})), \\
& 4 \lambda_1^2 \lambda_2^2 \left(-((\mu_{1,3}^2 + \mu_{1,4}^2) \mu_{4,2}) + \mu_{1,2} \mu_{1,4} (\mu_{3,3} + \mu_{4,4}) \right), \\
& 2 \lambda_1^2 \lambda_2^3 (-\lambda_4 \mu_{1,4} (\mu_{3,4} + \mu_{4,3}) + \lambda_3 (-\mu_{1,3} (\mu_{3,4} + \mu_{4,3}) + 2 \mu_{1,4} (\mu_{3,3} + \mu_{4,4}))), \\
& \left. 2 \lambda_1^2 \lambda_2^2 (\lambda_3^2 (\mu_{3,4} + \mu_{4,3}) + \lambda_4^2 (\mu_{3,4} + \mu_{4,3}) - 2 \lambda_3 \lambda_4 (\mu_{3,3} + \mu_{4,4})) \right\};
\end{aligned}$$

(*We start by the first case $(R_{1,2}R_{4,3} // m_{1,4 \rightarrow 1}) - (R_{1,2}R_{4,3} // m_{4,1 \rightarrow 1})$ *)

```

vari = {s1, s2, s3, w1, w2, w3, l1, l2, l3};
variL = {"s1", "s2", "s3", "w1", "w2", "w3", "l1", "l2", "l3"};
p = (R1,2 R4,3 // m1,4→1) - (R1,2 R4,3 // m4,1→1);
cr = CoefficientRules[p, vari];
convert[{v___Integer}] := StringJoin@Pick[variL, {v}, 1];
list = (convert[First[#]] → Last[#]) & /@ cr

```

Out[*]:=

$$\begin{aligned}
& \{ s_2 w_1 w_3 \rightarrow -2 \mu_{2,4} \mu_{3,2} + 2 \mu_{2,2} \mu_{3,4}, s_2 w_1 l_3 \rightarrow -2 \mu_{2,4} \mu_{4,2} + 2 \mu_{2,2} \mu_{4,4}, s_2 w_1 \rightarrow 2 \mu_{1,4} \mu_{2,2} - 2 \mu_{1,2} \mu_{2,4}, \\
& s_2 w_3 l_1 \rightarrow -2 \mu_{2,3} \mu_{3,2} + 2 \mu_{2,2} \mu_{3,3}, s_2 l_1 l_3 \rightarrow -2 \mu_{2,3} \mu_{4,2} + 2 \mu_{2,2} \mu_{4,3}, s_2 l_1 \rightarrow 2 \mu_{1,3} \mu_{2,2} - 2 \mu_{1,2} \mu_{2,3}, \\
& s_3 w_1 w_2 \rightarrow 2 \mu_{2,4} \mu_{3,2} - 2 \mu_{2,2} \mu_{3,4}, s_3 w_1 l_2 \rightarrow 2 \mu_{2,4} \mu_{4,2} - 2 \mu_{2,2} \mu_{4,4}, s_3 w_1 \rightarrow -2 \mu_{1,4} \mu_{2,2} + 2 \mu_{1,2} \mu_{2,4}, \\
& s_3 w_2 l_1 \rightarrow 2 \mu_{2,3} \mu_{3,2} - 2 \mu_{2,2} \mu_{3,3}, s_3 l_1 l_2 \rightarrow 2 \mu_{2,3} \mu_{4,2} - 2 \mu_{2,2} \mu_{4,3}, s_3 l_1 \rightarrow -2 \mu_{1,3} \mu_{2,2} + 2 \mu_{1,2} \mu_{2,3}, \\
& w_1 w_2 l_3 \rightarrow -2 \mu_{3,4} \mu_{4,2} + 2 \mu_{3,2} \mu_{4,4}, w_1 w_2 \rightarrow 2 \mu_{1,4} \mu_{3,2} - 2 \mu_{1,2} \mu_{3,4}, w_1 w_3 l_2 \rightarrow 2 \mu_{3,4} \mu_{4,2} - 2 \mu_{3,2} \mu_{4,4}, \\
& w_1 w_3 \rightarrow -2 \mu_{1,4} \mu_{3,2} + 2 \mu_{1,2} \mu_{3,4}, w_1 l_2 \rightarrow 2 \mu_{1,4} \mu_{4,2} - 2 \mu_{1,2} \mu_{4,4}, w_1 l_3 \rightarrow -2 \mu_{1,4} \mu_{4,2} + 2 \mu_{1,2} \mu_{4,4}, \\
& w_2 l_1 l_3 \rightarrow -2 \mu_{3,3} \mu_{4,2} + 2 \mu_{3,2} \mu_{4,3}, w_2 l_1 \rightarrow 2 \mu_{1,3} \mu_{3,2} - 2 \mu_{1,2} \mu_{3,3}, w_3 l_1 l_2 \rightarrow 2 \mu_{3,3} \mu_{4,2} - 2 \mu_{3,2} \mu_{4,3}, \\
& w_3 l_1 \rightarrow -2 \mu_{1,3} \mu_{3,2} + 2 \mu_{1,2} \mu_{3,3}, l_1 l_2 \rightarrow 2 \mu_{1,3} \mu_{4,2} - 2 \mu_{1,2} \mu_{4,3}, l_1 l_3 \rightarrow -2 \mu_{1,3} \mu_{4,2} + 2 \mu_{1,2} \mu_{4,3} \}
\end{aligned}$$

(*We need to check that the coefficients corresponding with monomials that have no two copies of w,l vanish. We start by listing them*)


```

In[*]:= (*λ2=0; λ3=0; λ4=0;*)
eqns1 = {};
vari = {s1, s2, s3, w1, w2, w3, l1, l2, l3};
p = ((R1,2 R4,3 R5,6 // m1,4→1 // m2,5→2 // m3,6→3) -
      (R1,6 R2,3 R4,5 // m1,4→1 // m2,5→2 // m3,6→3));
cr = CoefficientRules[p, vari];
eqns2 = Join[eqns1, Thread[Values[cr] == 0]];
vari = {s1, w1, l1};
p = (R1,3 κ2 // m1,2→1 // m1,3→1) - (R3,1 κ2 // m1,2→1 // m1,3→1);
cr = CoefficientRules[p, vari];
eqns3 = Join[eqns2, Thread[Values[cr] == 0]];
vari = {s1, s2, w1, w2, l1, l2};
p = ((κ1 κ2 R3,4 κ5 κ6 // m1,3→1 // m1,5→1 // m2,4→2 // m2,6→2) - R1,2);
cr = CoefficientRules[p, vari];
eqns4 = Join[eqns3, Thread[Values[cr] == 0]];
vari = {s1, s2, w1, w2, l1, l2};
p = ((R1,4 R3,2 κ6 // m1,3→1 // m2,6→2 // m2,4→2) - κ2);
cr = CoefficientRules[p, vari];
eqns5 = Join[eqns4, Thread[Values[cr] == 0]];

In[*]:= solutionslambda = Solve[(eqns5 /. {λ2 → 0, λ3 → 0, λ4 → 0}),

```

$\{\lambda_1, \mu_{1,1}, \mu_{1,2}, \mu_{1,3}, \mu_{1,4}, \mu_{2,1}, \mu_{2,2}, \mu_{2,3}, \mu_{2,4}, \mu_{3,1}, \mu_{3,2}, \mu_{3,3}, \mu_{3,4}, \mu_{4,1}, \mu_{4,2}, \mu_{4,3}, \mu_{4,4}\}$

... Solve: Equations may not give solutions for all "solve" variables.

Out[*]=

$\{\lambda_1 \rightarrow -1, \mu_{1,2} \rightarrow 0, \mu_{2,1} \rightarrow 0, \mu_{2,2} \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{4,2} \rightarrow 0\},$
 $\{\lambda_1 \rightarrow 1, \mu_{1,2} \rightarrow 0, \mu_{2,1} \rightarrow 0, \mu_{2,2} \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{4,2} \rightarrow 0\},$
 $\{\lambda_1 \rightarrow -1, \mu_{1,1} \rightarrow 0, \mu_{1,2} \rightarrow 0, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,1} \rightarrow 0, \mu_{2,3} \rightarrow \mu_{3,2}, \mu_{2,4} \rightarrow \mu_{4,2}, \mu_{3,1} \rightarrow 0, \mu_{4,1} \rightarrow 0\},$
 $\{\lambda_1 \rightarrow 1, \mu_{1,1} \rightarrow 0, \mu_{1,2} \rightarrow 0, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,1} \rightarrow 0, \mu_{2,3} \rightarrow \mu_{3,2}, \mu_{2,4} \rightarrow \mu_{4,2}, \mu_{3,1} \rightarrow 0, \mu_{4,1} \rightarrow 0\},$
 $\left\{\lambda_1 \rightarrow -1, \mu_{1,1} \rightarrow -\frac{\mu_{2,1}^2}{\mu_{2,2}}, \mu_{1,2} \rightarrow -\mu_{2,1}, \mu_{1,3} \rightarrow -\frac{\mu_{2,1} \mu_{3,2}}{\mu_{2,2}}, \mu_{1,4} \rightarrow -\frac{\mu_{2,1} \mu_{4,2}}{\mu_{2,2}}, \mu_{2,3} \rightarrow \mu_{3,2}, \mu_{2,4} \rightarrow \mu_{4,2}, \right.$
 $\left. \mu_{3,1} \rightarrow \frac{\mu_{2,1} \mu_{3,2}}{\mu_{2,2}}, \mu_{3,3} \rightarrow \frac{\mu_{3,2}^2 + \mu_{4,2}^2 - \mu_{2,2} \mu_{4,4}}{\mu_{2,2}}, \mu_{4,1} \rightarrow \frac{\mu_{2,1} \mu_{4,2}}{\mu_{2,2}}, \mu_{4,3} \rightarrow \frac{-\mu_{2,2} \mu_{3,4} + 2 \mu_{3,2} \mu_{4,2}}{\mu_{2,2}}\right\},$
 $\left\{\lambda_1 \rightarrow 1, \mu_{1,1} \rightarrow -\frac{\mu_{2,1}^2}{\mu_{2,2}}, \mu_{1,2} \rightarrow -\mu_{2,1}, \mu_{1,3} \rightarrow -\frac{\mu_{2,1} \mu_{3,2}}{\mu_{2,2}}, \mu_{1,4} \rightarrow -\frac{\mu_{2,1} \mu_{4,2}}{\mu_{2,2}}, \mu_{2,3} \rightarrow \mu_{3,2}, \mu_{2,4} \rightarrow \mu_{4,2}, \right.$
 $\left. \mu_{3,1} \rightarrow \frac{\mu_{2,1} \mu_{3,2}}{\mu_{2,2}}, \mu_{3,3} \rightarrow \frac{\mu_{3,2}^2 + \mu_{4,2}^2 - \mu_{2,2} \mu_{4,4}}{\mu_{2,2}}, \mu_{4,1} \rightarrow \frac{\mu_{2,1} \mu_{4,2}}{\mu_{2,2}}, \mu_{4,3} \rightarrow \frac{-\mu_{2,2} \mu_{3,4} + 2 \mu_{3,2} \mu_{4,2}}{\mu_{2,2}}\right\},$
 $\{\lambda_1 \rightarrow -1, \mu_{1,1} \rightarrow 0, \mu_{1,2} \rightarrow 0, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,1} \rightarrow 0, \mu_{2,3} \rightarrow \mu_{3,2}, \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0\},$
 $\{\lambda_1 \rightarrow 1, \mu_{1,1} \rightarrow 0, \mu_{1,2} \rightarrow 0, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,1} \rightarrow 0, \mu_{2,3} \rightarrow \mu_{3,2}, \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0\},$
 $\left\{\lambda_1 \rightarrow -1, \mu_{1,3} \rightarrow \frac{\mu_{1,2} \mu_{3,2}}{\mu_{2,2}}, \mu_{1,4} \rightarrow \frac{\mu_{1,2} \mu_{4,2}}{\mu_{2,2}}, \mu_{2,3} \rightarrow \mu_{3,2}, \mu_{2,4} \rightarrow \mu_{4,2}, \mu_{3,1} \rightarrow \frac{\mu_{2,1} \mu_{3,2}}{\mu_{2,2}}, \right.$
 $\left. \mu_{3,3} \rightarrow \frac{\mu_{3,2}^2}{\mu_{2,2}}, \mu_{3,4} \rightarrow \frac{\mu_{3,2} \mu_{4,2}}{\mu_{2,2}}, \mu_{4,1} \rightarrow \frac{\mu_{2,1} \mu_{4,2}}{\mu_{2,2}}, \mu_{4,3} \rightarrow \frac{\mu_{3,2} \mu_{4,2}}{\mu_{2,2}}, \mu_{4,4} \rightarrow \frac{\mu_{4,2}^2}{\mu_{2,2}}\right\},$
 $\left\{\lambda_1 \rightarrow 1, \mu_{1,3} \rightarrow \frac{\mu_{1,2} \mu_{3,2}}{\mu_{2,2}}, \mu_{1,4} \rightarrow \frac{\mu_{1,2} \mu_{4,2}}{\mu_{2,2}}, \mu_{2,3} \rightarrow \mu_{3,2}, \mu_{2,4} \rightarrow \mu_{4,2}, \mu_{3,1} \rightarrow \frac{\mu_{2,1} \mu_{3,2}}{\mu_{2,2}}, \right.$

[illegible]

[illegible]

(*For all cases, the coefficients are zero:*)

$$In[\bullet]:= \text{equaciones /. solutionslambda /. } \{\lambda_2 \rightarrow 0, \lambda_3 \rightarrow 0, \lambda_4 \rightarrow 0\}$$

Out[•]=

[illegible]

(*Now case (b):*)

```

In[*]:= eqns1 = {};
vari = {s1, s2, s3, w1, w2, w3, l1, l2, l3};
p = ((R1,2 R4,3 R5,6 // m1,4→1 // m2,5→2 // m3,6→3) -
      (R1,6 R2,3 R4,5 // m1,4→1 // m2,5→2 // m3,6→3));
cr = CoefficientRules[p, vari];
eqns2 = Join[eqns1, Thread[Values[cr] == 0]];
vari = {s1, w1, l1};
p = (R1,3 κ2 // m1,2→1 // m1,3→1) - (R3,1 κ2 // m1,2→1 // m1,3→1);
cr = CoefficientRules[p, vari];
eqns3 = Join[eqns2, Thread[Values[cr] == 0]];
vari = {s1, s2, w1, w2, l1, l2};
p = ((κ1 κ2 R3,4 κ5 κ6 // m1,3→1 // m1,5→1 // m2,4→2 // m2,6→2) - R1,2);
cr = CoefficientRules[p, vari];
eqns4 = Join[eqns3, Thread[Values[cr] == 0]];
vari = {s1, s2, w1, w2, l1, l2};
p = ((R1,4 R3,2 κ6 // m1,3→1 // m2,6→2 // m2,4→2) - κ2);
cr = CoefficientRules[p, vari];
eqns5 = Join[eqns4, Thread[Values[cr] == 0]];

```

```

In[*]:= solutionsmu = Solve[eqns5 /. {μ1,2 → 0, μ2,1 → 0, μ2,2 → 0},
  {λ1, λ2, λ3, λ4, μ1,1, μ1,3, μ1,4, μ2,3, μ2,4, μ3,1, μ3,2, μ3,3, μ3,4, μ4,1, μ4,2, μ4,3, μ4,4}]

```

... Solve: Equations may not give solutions for all "solve" variables.

Out[*]=

$$\begin{aligned}
& \left\{ \lambda_1 \rightarrow -1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow 0, \lambda_4 \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{4,2} \rightarrow 0 \right\}, \\
& \left\{ \lambda_1 \rightarrow 1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow 0, \lambda_4 \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{4,2} \rightarrow 0 \right\}, \\
& \left\{ \lambda_1 \rightarrow -1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow 0, \lambda_4 \rightarrow 0, \mu_{1,3} \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{4,2} \rightarrow 0 \right\}, \\
& \left\{ \lambda_1 \rightarrow -1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow 0, \lambda_4 \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0 \right\}, \\
& \left\{ \lambda_1 \rightarrow 1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow 0, \lambda_4 \rightarrow 0, \mu_{1,3} \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{4,2} \rightarrow 0 \right\}, \\
& \left\{ \lambda_1 \rightarrow 1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow 0, \lambda_4 \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0 \right\}, \left\{ \lambda_1 \rightarrow -1, \right. \\
& \quad \left. \lambda_2 \rightarrow 0, \lambda_3 \rightarrow 0, \lambda_4 \rightarrow 0, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0 \right\}, \\
& \left\{ \lambda_1 \rightarrow -1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow -\frac{2\mu_{2,3}}{\mu_{1,1}}, \lambda_4 \rightarrow \frac{2\mu_{2,3}}{\mu_{1,1}}, \mu_{1,4} \rightarrow -\mu_{1,3}, \mu_{2,4} \rightarrow -\mu_{2,3}, \mu_{3,1} \rightarrow -\mu_{1,3}, \mu_{3,2} \rightarrow -\mu_{2,3}, \right. \\
& \quad \left. \mu_{4,1} \rightarrow \mu_{1,3}, \mu_{4,2} \rightarrow \mu_{2,3}, \mu_{4,3} \rightarrow \frac{2\mu_{1,3}^2 - 2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,4}}{\mu_{1,1}}, \mu_{4,4} \rightarrow \frac{-2\mu_{1,3}^2 + 2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,3}}{\mu_{1,1}} \right\}, \\
& \left\{ \lambda_1 \rightarrow -1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow \frac{2\mu_{2,3}}{\mu_{1,1}}, \lambda_4 \rightarrow \frac{2\mu_{2,3}}{\mu_{1,1}}, \mu_{1,4} \rightarrow \mu_{1,3}, \mu_{2,4} \rightarrow \mu_{2,3}, \mu_{3,1} \rightarrow -\mu_{1,3}, \mu_{3,2} \rightarrow -\mu_{2,3}, \right. \\
& \quad \left. \mu_{4,1} \rightarrow -\mu_{1,3}, \mu_{4,2} \rightarrow -\mu_{2,3}, \mu_{4,3} \rightarrow \frac{-2\mu_{1,3}^2 + 2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,4}}{\mu_{1,1}}, \mu_{4,4} \rightarrow \frac{-2\mu_{1,3}^2 + 2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,3}}{\mu_{1,1}} \right\}, \\
& \left\{ \lambda_1 \rightarrow 1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow 0, \lambda_4 \rightarrow 0, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0 \right\}, \\
& \left\{ \lambda_1 \rightarrow 1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow \frac{2\mu_{2,3}}{\mu_{1,1}}, \lambda_4 \rightarrow -\frac{2\mu_{2,3}}{\mu_{1,1}}, \mu_{1,4} \rightarrow -\mu_{1,3}, \mu_{2,4} \rightarrow -\mu_{2,3}, \mu_{3,1} \rightarrow -\mu_{1,3}, \mu_{3,2} \rightarrow -\mu_{2,3}, \right. \\
& \quad \left. \mu_{4,1} \rightarrow \mu_{1,3}, \mu_{4,2} \rightarrow \mu_{2,3}, \mu_{4,3} \rightarrow \frac{2\mu_{1,3}^2 - 2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,4}}{\mu_{1,1}}, \mu_{4,4} \rightarrow \frac{-2\mu_{1,3}^2 + 2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,3}}{\mu_{1,1}} \right\}, \\
& \left\{ \lambda_1 \rightarrow 1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow -\frac{2\mu_{2,3}}{\mu_{1,1}}, \lambda_4 \rightarrow -\frac{2\mu_{2,3}}{\mu_{1,1}}, \mu_{1,4} \rightarrow \mu_{1,3}, \mu_{2,4} \rightarrow \mu_{2,3}, \mu_{3,1} \rightarrow -\mu_{1,3}, \mu_{3,2} \rightarrow -\mu_{2,3}, \right.
\end{aligned}$$

$$\begin{aligned}
& \mu_{4,1} \rightarrow -\mu_{1,3}, \mu_{4,2} \rightarrow -\mu_{2,3}, \mu_{4,3} \rightarrow \frac{-2\mu_{1,3}^2 + 2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,4}}{\mu_{1,1}}, \mu_{4,4} \rightarrow \frac{-2\mu_{1,3}^2 + 2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,3}}{\mu_{1,1}} \}, \\
& \left\{ \lambda_1 \rightarrow -1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow -\frac{2\mu_{2,3}}{\mu_{1,1}}, \lambda_4 \rightarrow \frac{2\mu_{2,3}}{\mu_{1,1}}, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,4} \rightarrow -\mu_{2,3}, \mu_{3,1} \rightarrow 0, \right. \\
& \left. \mu_{3,2} \rightarrow -\mu_{2,3}, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow \mu_{2,3}, \mu_{4,3} \rightarrow \frac{-2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,4}}{\mu_{1,1}}, \mu_{4,4} \rightarrow \frac{2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,3}}{\mu_{1,1}} \right\}, \\
& \left\{ \lambda_1 \rightarrow -1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow \frac{2\mu_{2,3}}{\mu_{1,1}}, \lambda_4 \rightarrow \frac{2\mu_{2,3}}{\mu_{1,1}}, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,4} \rightarrow \mu_{2,3}, \mu_{3,1} \rightarrow 0, \right. \\
& \left. \mu_{3,2} \rightarrow -\mu_{2,3}, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow -\mu_{2,3}, \mu_{4,3} \rightarrow \frac{2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,4}}{\mu_{1,1}}, \mu_{4,4} \rightarrow \frac{2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,3}}{\mu_{1,1}} \right\}, \\
& \left\{ \lambda_1 \rightarrow 1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow \frac{2\mu_{2,3}}{\mu_{1,1}}, \lambda_4 \rightarrow -\frac{2\mu_{2,3}}{\mu_{1,1}}, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,4} \rightarrow -\mu_{2,3}, \mu_{3,1} \rightarrow 0, \right. \\
& \left. \mu_{3,2} \rightarrow -\mu_{2,3}, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow \mu_{2,3}, \mu_{4,3} \rightarrow \frac{-2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,4}}{\mu_{1,1}}, \mu_{4,4} \rightarrow \frac{2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,3}}{\mu_{1,1}} \right\}, \\
& \left\{ \lambda_1 \rightarrow 1, \lambda_2 \rightarrow 0, \lambda_3 \rightarrow -\frac{2\mu_{2,3}}{\mu_{1,1}}, \lambda_4 \rightarrow -\frac{2\mu_{2,3}}{\mu_{1,1}}, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,4} \rightarrow \mu_{2,3}, \mu_{3,1} \rightarrow 0, \right. \\
& \left. \mu_{3,2} \rightarrow -\mu_{2,3}, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow -\mu_{2,3}, \mu_{4,3} \rightarrow \frac{2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,4}}{\mu_{1,1}}, \mu_{4,4} \rightarrow \frac{2\mu_{2,3}^2 - \mu_{1,1}\mu_{3,3}}{\mu_{1,1}} \right\}, \\
& \left\{ \lambda_1 \rightarrow 0, \lambda_2 \rightarrow -1, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{3,3} \rightarrow 0, \mu_{3,4} \rightarrow 0, \right. \\
& \left. \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0, \mu_{4,3} \rightarrow 0, \mu_{4,4} \rightarrow 0 \right\}, \left\{ \lambda_1 \rightarrow 0, \lambda_2 \rightarrow -1, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,3} \rightarrow 0, \right. \\
& \left. \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{3,3} \rightarrow 0, \mu_{3,4} \rightarrow 0, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0, \mu_{4,3} \rightarrow 0, \mu_{4,4} \rightarrow 0 \right\}, \\
& \left\{ \lambda_1 \rightarrow 0, \lambda_2 \rightarrow -1, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{3,3} \rightarrow 0, \mu_{3,4} \rightarrow 0, \right. \\
& \left. \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0, \mu_{4,3} \rightarrow 0, \mu_{4,4} \rightarrow 0 \right\}, \left\{ \lambda_1 \rightarrow 0, \lambda_2 \rightarrow 1, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,3} \rightarrow 0, \right. \\
& \left. \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{3,3} \rightarrow 0, \mu_{3,4} \rightarrow 0, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0, \mu_{4,3} \rightarrow 0, \mu_{4,4} \rightarrow 0 \right\}, \\
& \left\{ \lambda_1 \rightarrow 0, \lambda_2 \rightarrow 1, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,3} \rightarrow 0, \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{3,3} \rightarrow 0, \mu_{3,4} \rightarrow 0, \right. \\
& \left. \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0, \mu_{4,3} \rightarrow 0, \mu_{4,4} \rightarrow 0 \right\}, \left\{ \lambda_1 \rightarrow 0, \lambda_2 \rightarrow 1, \mu_{1,3} \rightarrow 0, \mu_{1,4} \rightarrow 0, \mu_{2,3} \rightarrow 0, \right. \\
& \left. \mu_{2,4} \rightarrow 0, \mu_{3,1} \rightarrow 0, \mu_{3,2} \rightarrow 0, \mu_{3,3} \rightarrow 0, \mu_{3,4} \rightarrow 0, \mu_{4,1} \rightarrow 0, \mu_{4,2} \rightarrow 0, \mu_{4,3} \rightarrow 0, \mu_{4,4} \rightarrow 0 \right\} \}
\end{aligned}$$

(*We again have a finite number of cases. For all of them, the coefficients are zero:*)

In[*]:= equaciones /. solutionsmu /. { $\mu_{1,2} \rightarrow 0$, $\mu_{2,1} \rightarrow 0$, $\mu_{2,2} \rightarrow 0$ }

Out[*]=

{{0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0},
{0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0},
{0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}, {0, 0, 0, 0}}

Finally, we do it for the 12 cases at once. We clear out denominators when using the inverse R-matrix.

$$\begin{aligned} & \left\{ \left\{ \left\{ 0, 0, 0, 0, \frac{2 \mu_{1,1} \mu_{1,2} - 2 \mu_{2,1} \mu_{2,2}}{\lambda_2}, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \right. \right. \right. \\ & \quad \left. \left. \left. 0, 0 \right\}, 0 \right\}, \right. \\ & \left\{ \left\{ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \frac{2 \mu_{1,1} \mu_{1,2} - 2 \mu_{2,1} \mu_{2,2}}{\lambda_2}, 0, 0, 0, 0, 0, \right. \right. \\ & \quad \left. \left. 0, 0 \right\}, 0 \right\}, \\ & \left\{ \left\{ 0, 0, 0, 0, \frac{\mu_{1,1}^2 + \mu_{1,2}^2 - \mu_{2,1}^2 - \mu_{2,2}^2}{\lambda_2}, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \right. \right. \\ & \quad \left. \left. 0, 0 \right\}, 0 \right\}, \\ & \left\{ \left\{ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \frac{\mu_{1,1}^2 + \mu_{1,2}^2 - \mu_{2,1}^2 - \mu_{2,2}^2}{\lambda_2}, 0, 0, 0, 0, 0, \right. \right. \\ & \quad \left. \left. 0, 0 \right\}, 0 \right\}, \\ & \left\{ \left\{ 0, 0, 0, 0, \frac{-\mu_{1,1}^2 - \mu_{1,2}^2 + \mu_{2,1}^2 + \mu_{2,2}^2}{\lambda_2}, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \right. \right. \\ & \quad \left. \left. 0, 0 \right\}, 0 \right\}, \\ & \left\{ \left\{ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \frac{-\mu_{1,1}^2 - \mu_{1,2}^2 + \mu_{2,1}^2 + \mu_{2,2}^2}{\lambda_2}, 0, 0, 0, 0, \right. \right. \\ & \quad \left. \left. 0, 0 \right\}, 0 \right\}, \\ & \left\{ \left\{ 0, 0, 0, 0, \frac{-2 \mu_{1,1} \mu_{1,2} + 2 \mu_{2,1} \mu_{2,2}}{\lambda_2}, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \right. \right. \\ & \quad \left. \left. 0, 0 \right\}, 0 \right\}, \\ & \left\{ \left\{ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \frac{-2 \mu_{1,1} \mu_{1,2} + 2 \mu_{2,1} \mu_{2,2}}{\lambda_2}, 0, 0, 0, 0, \right. \right. \\ & \quad \left. \left. 0, 0 \right\}, 0 \right\}, \\ & \left\{ \left\{ \left\{ -\frac{\mu_{1,2} \left(\mu_{1,1}^4 + \mu_{1,2}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} + (\mu_{2,1}^2 - \mu_{2,2}^2)^2 - 2 \mu_{1,2}^2 (\mu_{2,1}^2 + \mu_{2,2}^2) - 2 \mu_{1,1}^2 (\mu_{1,2}^2 + \mu_{2,1}^2 + \mu_{2,2}^2) \right)}{\lambda_2}, \right. \right. \right. \\ & \quad \left. \left. 0, 0, 0, \frac{\mu_{1,2} \left(2 \mu_{1,1}^2 \mu_{2,1} - 8 \mu_{1,1} \mu_{1,2} \mu_{2,2} + \mu_{2,1} \left(2 \mu_{1,2}^2 - \mu_{2,1}^2 + 2 \mu_{2,2}^2 \right) \right)}{\lambda_2}, 0, \right. \right. \\ & \quad \left. \left. 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -\frac{\mu_{1,1}^4 + (\mu_{1,2}^2 - \mu_{2,2}^2)^2 - 2 \mu_{1,1}^2 (\mu_{1,2}^2 + \mu_{2,2}^2)}{\lambda_2}, \right. \right. \\ & \quad \left. \left. 0, 0, 0, \frac{\mu_{2,2} \left(2 \mu_{1,1}^2 \mu_{2,1} - 8 \mu_{1,1} \mu_{1,2} \mu_{2,2} + \mu_{2,1} \left(2 \mu_{1,2}^2 - \mu_{2,1}^2 + 2 \mu_{2,2}^2 \right) \right)}{\lambda_2}, \right. \right. \\ & \quad \left. \left. 0, 0 \right\}, 0 \right\}, \\ & \left\{ \left\{ 0, \frac{\mu_{1,2} \left(\mu_{1,1}^4 + \mu_{1,2}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} + (\mu_{2,1}^2 - \mu_{2,2}^2)^2 - 2 \mu_{1,2}^2 (\mu_{2,1}^2 + \mu_{2,2}^2) - 2 \mu_{1,1}^2 (\mu_{1,2}^2 + \mu_{2,1}^2 + \mu_{2,2}^2) \right)}{\lambda_2}, \right. \right. \\ & \quad \left. \left. 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \frac{\mu_{1,2} \left(2 \mu_{1,1}^2 \mu_{2,1} - 8 \mu_{1,1} \mu_{1,2} \mu_{2,2} + \mu_{2,1} \left(2 \mu_{1,2}^2 - \mu_{2,1}^2 + 2 \mu_{2,2}^2 \right) \right)}{\lambda_2}, \right. \right. \\ & \quad \left. \left. 0, 0, 0, 0, -\frac{\mu_{1,1}^4 + (\mu_{1,2}^2 - \mu_{2,2}^2)^2 - 2 \mu_{1,1}^2 (\mu_{1,2}^2 + \mu_{2,2}^2)}{\lambda_2}, 0, 0, 0, \right. \right. \end{aligned}$$

$$\begin{aligned}
& \left\{ \left\{ \frac{\mu_{1,2} (\mu_{1,1}^4 + \mu_{1,2}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} + (\mu_{2,1}^2 - \mu_{2,2}^2)^2 - 2 \mu_{1,2}^2 (\mu_{2,1}^2 + \mu_{2,2}^2) - 2 \mu_{1,1}^2 (\mu_{1,2}^2 + \mu_{2,1}^2 + \mu_{2,2}^2))}{\lambda_2}, \right. \right. \\
& \quad 0, 0, 0, \frac{\mu_{1,2} (-2 \mu_{1,1}^2 \mu_{2,1} + 8 \mu_{1,1} \mu_{1,2} \mu_{2,2} + \mu_{2,1} (-2 \mu_{1,2}^2 + \mu_{2,1}^2 - 2 \mu_{2,2}^2))}{\lambda_2}, 0, \\
& \quad 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \frac{\mu_{1,1}^4 + (\mu_{1,2}^2 - \mu_{2,2}^2)^2 - 2 \mu_{1,1}^2 (\mu_{1,2}^2 + \mu_{2,2}^2)}{\lambda_2}, \\
& \quad 0, 0, 0, \frac{\mu_{2,2} (-2 \mu_{1,1}^2 \mu_{2,1} + 8 \mu_{1,1} \mu_{1,2} \mu_{2,2} + \mu_{2,1} (-2 \mu_{1,2}^2 + \mu_{2,1}^2 - 2 \mu_{2,2}^2))}{\lambda_2}, \\
& \quad 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 \}, 0 \}, \\
& \left\{ \left\{ 0, -\frac{\mu_{1,2} (\mu_{1,1}^4 + \mu_{1,2}^4 + 8 \mu_{1,1} \mu_{1,2} \mu_{2,1} \mu_{2,2} + (\mu_{2,1}^2 - \mu_{2,2}^2)^2 - 2 \mu_{1,2}^2 (\mu_{2,1}^2 + \mu_{2,2}^2) - 2 \mu_{1,1}^2 (\mu_{1,2}^2 + \mu_{2,1}^2 + \mu_{2,2}^2))}{\lambda_2}, \right. \right. \\
& \quad 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \frac{\mu_{1,2} (-2 \mu_{1,1}^2 \mu_{2,1} + 8 \mu_{1,1} \mu_{1,2} \mu_{2,2} + \mu_{2,1} (-2 \mu_{1,2}^2 + \mu_{2,1}^2 - 2 \mu_{2,2}^2))}{\lambda_2}, \\
& \quad 0, 0, 0, \frac{\mu_{1,1}^4 + (\mu_{1,2}^2 - \mu_{2,2}^2)^2 - 2 \mu_{1,1}^2 (\mu_{1,2}^2 + \mu_{2,2}^2)}{\lambda_2}, 0, 0, 0, 0, \\
& \quad \frac{\mu_{2,2} (-2 \mu_{1,1}^2 \mu_{2,1} + 8 \mu_{1,1} \mu_{1,2} \mu_{2,2} + \mu_{2,1} (-2 \mu_{1,2}^2 + \mu_{2,1}^2 - 2 \mu_{2,2}^2))}{\lambda_2}, \\
& \quad 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 \}, 0 \}, \\
& \left\{ \left\{ \frac{1}{\lambda_2} (-2 \mu_{1,1}^3 \mu_{1,2} \mu_{2,1} + \mu_{1,1}^4 \mu_{2,2} + 2 \mu_{1,1}^2 \mu_{2,2} (\mu_{2,1}^2 - \mu_{2,2}^2) + 2 \mu_{1,1} \mu_{1,2} \mu_{2,1} (\mu_{1,2}^2 - \mu_{2,1}^2 + \mu_{2,2}^2) + \right. \right. \\
& \quad \mu_{2,2} (-\mu_{1,2}^4 + (\mu_{2,1}^2 - \mu_{2,2}^2)^2)), 0, 0, 0, \frac{2 (2 \mu_{1,1} (\mu_{1,2}^3 - \mu_{1,2} \mu_{2,1}^2) + \mu_{1,1}^2 \mu_{2,1} \mu_{2,2} + \mu_{2,1} \mu_{2,2} (\mu_{2,1}^2 - \mu_{2,2}^2))}{\lambda_2}, \\
& \quad 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -\frac{2 \mu_{1,2} \mu_{2,2} (\mu_{1,1}^2 + \mu_{1,2}^2 - \mu_{2,2}^2)}{\lambda_2}, 0, 0, 0, 0, \\
& \quad \frac{2 (-2 \mu_{1,1}^2 \mu_{1,2} \mu_{2,1} + \mu_{1,1}^3 \mu_{2,2} - \mu_{1,2} \mu_{2,1} \mu_{2,2}^2 + \mu_{1,1} \mu_{2,2} (3 \mu_{1,2}^2 + \mu_{2,1}^2 - \mu_{2,2}^2))}{\lambda_2}, \\
& \quad 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 \}, 0 \}, \\
& \left\{ \left\{ 0, \frac{1}{\lambda_2} (2 \mu_{1,1}^3 \mu_{1,2} \mu_{2,1} - \mu_{1,1}^4 \mu_{2,2} - 2 \mu_{1,1} \mu_{1,2} \mu_{2,1} (\mu_{1,2}^2 - \mu_{2,1}^2 + \mu_{2,2}^2) + \mu_{1,1}^2 (-2 \mu_{2,1}^2 \mu_{2,2} + 2 \mu_{2,2}^3) - \right. \right. \\
& \quad \mu_{2,2} (-\mu_{1,2}^4 + (\mu_{2,1}^2 - \mu_{2,2}^2)^2)), 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \\
& \quad \frac{2 (2 \mu_{1,1} (\mu_{1,2}^3 - \mu_{1,2} \mu_{2,1}^2) + \mu_{1,1}^2 \mu_{2,1} \mu_{2,2} + \mu_{2,1} \mu_{2,2} (\mu_{2,1}^2 - \mu_{2,2}^2))}{\lambda_2}, 0, 0, 0, -\frac{2 \mu_{1,2} \mu_{2,2} (\mu_{1,1}^2 + \mu_{1,2}^2 - \mu_{2,2}^2)}{\lambda_2}, \\
& \quad 0, 0, 0, \frac{2 (-2 \mu_{1,1}^2 \mu_{1,2} \mu_{2,1} + \mu_{1,1}^3 \mu_{2,2} - \mu_{1,2} \mu_{2,1} \mu_{2,2}^2 + \mu_{1,1} \mu_{2,2} (3 \mu_{1,2}^2 + \mu_{2,1}^2 - \mu_{2,2}^2))}{\lambda_2}, \\
& \quad 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 \}, 0 \}, \\
& \left\{ \left\{ \frac{2 (-\mu_{1,1}^3 \mu_{2,1} \mu_{2,2} + \mu_{1,2} \mu_{2,2}^2 (\mu_{1,2}^2 + \mu_{2,1}^2 - \mu_{2,2}^2) + \mu_{1,1} \mu_{2,1} \mu_{2,2} (-3 \mu_{1,2}^2 - \mu_{2,1}^2 + \mu_{2,2}^2) + \mu_{1,1}^2 \mu_{1,2} (2 \mu_{2,1}^2 + \mu_{2,2}^2))}{\lambda_2}, \right. \right. \\
& \quad 0, 0, 0, \frac{4 \mu_{1,1}^2 \mu_{1,2} \mu_{2,1} - 4 \mu_{1,1} (\mu_{1,2}^2 + \mu_{2,1}^2) \mu_{2,2} + \mu_{1,2} \mu_{2,1} (-2 \mu_{1,2}^2 + \mu_{2,1}^2 + 4 \mu_{2,2}^2)}{\lambda_2}, \\
& \quad 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -\frac{\mu_{1,1}^4 - \mu_{1,2}^4 - 2 \mu_{1,1}^2 \mu_{2,2}^2 + \mu_{2,2}^4}{\lambda_2}, 0, 0, 0, 0,
\end{aligned}$$

[illegible]

```
In[*]:= totalecuaciones /. solutionslambda /. {λ2 → 0, λ3 → 0, λ4 → 0} // Simplify
Out[*]=
```

[illegible]

[illegible]
$$\ln[*] := \text{totalequaciones} /. \text{solutionsmu} /. \{\mu_{1,2} \rightarrow 0, \mu_{2,1} \rightarrow 0, \mu_{2,2} \rightarrow 0\} // \text{Simplify}$$

Out[•]=

[illegible]

