

$$\begin{aligned}
& L[X_{i_ , j_ }[s_]] := \text{Plus} \Big[\\
& \sum_{v=1}^3 \left(\mathbf{x}_{vi} (\mathbf{p}_{vi^+} - \mathbf{p}_{vj}) + \mathbf{x}_{vj} (\mathbf{p}_{vj^+} - \mathbf{p}_{vj}) + \left(\mathbf{T}_v^s - \mathbf{1} \right) \mathbf{x}_{vi} (\mathbf{p}_{vi^+} - \mathbf{p}_{vj^+}) \right), \\
& \left(\mathbf{T}_1^s - \mathbf{1} \right) \mathbf{p}_{3j} \mathbf{x}_{1i} \left(\mathbf{T}_2^s \mathbf{x}_{2i} - \mathbf{x}_{2j} \right), \\
& \in s \left(\mathbf{T}_3^s - \mathbf{1} \right) \mathbf{p}_{1j} (\mathbf{p}_{2i} - \mathbf{p}_{2j}) \mathbf{x}_{3i} / \left(\mathbf{T}_2^s - \mathbf{1} \right), \\
& \in s \left(\mathbf{1} / 2 + \mathbf{T}_2^s \mathbf{p}_{1i} \mathbf{p}_{2j} \mathbf{x}_{1i} \mathbf{x}_{2i} - \mathbf{p}_{1i} \mathbf{p}_{2j} \mathbf{x}_{1i} \mathbf{x}_{2j} - \mathbf{p}_{3i} \mathbf{x}_{3i} - \left(\mathbf{T}_2^s - \mathbf{1} \right) \mathbf{p}_{2j} \mathbf{p}_{3i} \mathbf{x}_{2i} \mathbf{x}_{3i} + \right. \\
& \quad \left(\mathbf{T}_3^s - \mathbf{1} \right) \mathbf{p}_{2j} \mathbf{p}_{3j} \mathbf{x}_{2i} \mathbf{x}_{3i} + 2 \mathbf{p}_{2j} \mathbf{p}_{3i} \mathbf{x}_{2j} \mathbf{x}_{3i} + \mathbf{p}_{1i} \mathbf{p}_{3j} \mathbf{x}_{1i} \mathbf{x}_{3j} - \mathbf{p}_{2i} \mathbf{p}_{3j} \mathbf{x}_{2i} \mathbf{x}_{3j} - \\
& \quad \mathbf{T}_2^s \mathbf{p}_{2j} \mathbf{p}_{3j} \mathbf{x}_{2i} \mathbf{x}_{3j} + \\
& \quad \left(\left(\mathbf{T}_1^s - \mathbf{1} \right) \mathbf{p}_{1j} \mathbf{x}_{1i} \left(\mathbf{T}_2^{2s} \mathbf{p}_{2j} \mathbf{x}_{2i} - \mathbf{T}_2^s \mathbf{p}_{2j} \mathbf{x}_{2j} - \left(\mathbf{T}_2^s + \mathbf{1} \right) \left(\mathbf{T}_3^s - \mathbf{1} \right) \mathbf{p}_{3j} \mathbf{x}_{3i} + \right. \right. \\
& \quad \left. \left. \mathbf{T}_2^s \mathbf{p}_{3j} \mathbf{x}_{3j} \right) + \left(\mathbf{T}_3^s - \mathbf{1} \right) \mathbf{p}_{3j} \mathbf{x}_{3i} \right. \\
& \quad \left. \left. \left(\mathbf{1} - \mathbf{T}_2^s \mathbf{p}_{1i} \mathbf{x}_{1i} + \mathbf{p}_{2i} \mathbf{x}_{2j} + \left(\mathbf{T}_2^s - 2 \right) \mathbf{p}_{2j} \mathbf{x}_{2j} \right) \right) / \left(\mathbf{T}_2^s - \mathbf{1} \right) \Big]
\end{aligned}$$