

| | $\Delta_{1^{+}}^{\#1}{}^{a\beta}$ | $\Delta_{1^{+}}^{\#2}{}^{a\beta}$ | $\Delta_{1^{+}}^{\#3}{}^{a\beta}$ | $\Delta_{1^{\alpha}}^{\#1}$ | $\Delta_{1^{\alpha}}^{\#2}$ | $\Delta_{1^{\alpha}}^{\#3}$ | $\Delta_{1^{\alpha}}^{\#4}$ | $\Delta_{1^{\alpha}}^{\#5}$ | $\Delta_{1^{\alpha}}^{\#6}$ | $\mathcal{T}_{1^{\alpha}}^{\#1}$ |
|-----------------------------------|---|---|---|--|--|---|---------------------------------------|--|---|----------------------------------|
| $\Delta_{1^{+}}^{\#1}{}^{a\beta}$ | $\frac{4}{3}(-\frac{1}{a_0+4a_1+4a_2}+(a_0-4a_1-2a_2-3a_3+16a_6-4a_7-2a_9)/(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9)))$ | $\frac{2}{3}\sqrt{2}(-\frac{1}{a_0+4a_1+4a_2}+(-2a_0+8a_1+4a_2+6a_3-32a_6+8a_7+4a_9)/(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9)))$ | $\frac{4(2a_1+a_2+a_9)}{3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\Delta_{1^{+}}^{\#2}{}^{a\beta}$ | $\frac{2}{3}\sqrt{2}(-\frac{1}{a_0+4a_1+4a_2}+(-2a_0+8a_1+4a_2+6a_3-32a_6+8a_7+4a_9)/(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9)))$ | $-\frac{2}{3(a_0+4a_1+4a_2)}+(8(a_0-4a_1-2a_2-3a_3+16a_6-4a_7-2a_9)/(3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))))$ | $-((4\sqrt{2}(2a_1+a_2+a_9)/(3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))))$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\Delta_{1^{+}}^{\#3}{}^{a\beta}$ | $\frac{4(2a_1+a_2+a_9)}{3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ | $-((4\sqrt{2}(2a_1+a_2+a_9)/(3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))))$ | $\frac{4(a_0+2a_1+a_2)}{3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\Delta_{1^{\alpha}}^{\#1}$ | 0 | 0 | 0 | $\frac{4}{3}(-\frac{2}{2a_0+2a_1+a_2+3a_3}+(a_0-4a_1-2a_2-3a_3+16a_6-4a_7-2a_9)/(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9)))$ | $(4\sqrt{2}(3a_0^2-4a_1^2-a_2^2-3a_3(3a_3+4(-4a_6+a_7))-6a_3a_9-a_9^2-2a_2(3a_3+a_9)-4a_1(a_2+3a_3+a_9)-6a_0(2a_1+a_2+a_3-8a_6+2a_7+a_9)))/(3(2a_0+2a_1+a_2+3a_3)(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))))$ | 0 | 0 | $\frac{4\sqrt{\frac{2}{3}}(2a_1+a_2+a_9)}{3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ | $-((4(2a_1+a_2+a_9)/(3\sqrt{3}(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))))$ | 0 |
| $\Delta_{1^{\alpha}}^{\#2}$ | 0 | 0 | 0 | $(4\sqrt{2}(3a_0^2-4a_1^2-a_2^2-3a_3(3a_3+4(-4a_6+a_7))-6a_3a_9-a_9^2-2a_2(3a_3+a_9)-4a_1(a_2+3a_3+a_9)-6a_0(2a_1+a_2+a_3-8a_6+2a_7+a_9)))/(3(2a_0+2a_1+a_2+3a_3)(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))))$ | $-\frac{4}{3(2a_0+2a_1+a_2+3a_3)}+(8(a_0-4a_1-2a_2-3a_3+16a_6-4a_7-2a_9)/(3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))))$ | 0 | 0 | $\frac{8(2a_1+a_2+a_9)/(3\sqrt{3}(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9)))}{-((4\sqrt{\frac{2}{3}}(2a_1+a_2+a_9)/(3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))))$ | 0 | |
| $\Delta_{1^{\alpha}}^{\#3}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5}{18(a_0+4a_6-4a_7)}$ | $-\frac{\sqrt{5}}{18(a_0+4a_6-4a_7)}$ | 0 | 0 | 0 |
| $\Delta_{1^{\alpha}}^{\#4}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{18(a_0+4a_6-4a_7)}$ | 0 | 0 | 0 |
| $\Delta_{1^{\alpha}}^{\#5}$ | 0 | 0 | 0 | 0 | 0 | $\frac{4\sqrt{\frac{2}{3}}(2a_1+a_2+a_9)}{3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ | 0 | 0 | $\frac{8(a_0+2a_1+a_2)}{9(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ | 0 |
| $\Delta_{1^{\alpha}}^{\#6}$ | 0 | 0 | 0 | $-((4(2a_1+a_2+a_9)/(3\sqrt{3}(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))))$ | $-((4\sqrt{\frac{2}{3}}(2a_1+a_2+a_9)/(3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))))$ | 0 | 0 | $\frac{4\sqrt{2}(-a_0+2a_1+a_2)}{9(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)-a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ | 0 | |
| $\mathcal{T}_{1^{\alpha}}^{\#1}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | $\Gamma_1^{\#1}{}^{+a\beta}$ | $\Gamma_1^{\#2}{}^{+a\beta}$ | $\Gamma_1^{\#3}{}^{+a\beta}$ | $\Gamma_1^{\#1}{}^{\alpha}$ | $\Gamma_1^{\#2}{}^{\alpha}$ | $\Gamma_1^{\#3}{}^{\alpha}$ | $\Gamma_1^{\#4}{}^{\alpha}$ | $\Gamma_1^{\#5}{}^{\alpha}$ | $\Gamma_1^{\#6}{}^{\alpha}$ | $h_1^{\#1}{}^{\alpha}$ |
|------------------------------|------------------------------------|------------------------------------|---|-----------------------------------|-----------------------------------|--------------------------------------|--------------------------------------|---|---|------------------------|
| $\Gamma_1^{\#1}{}^{+a\beta}$ | $\frac{3}{4}(-a_0-6a_1+5a_2)$ | $-\frac{a_0+2a_1-3a_2}{2\sqrt{2}}$ | $\frac{1}{4}(-2a_1-a_2-a_9)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\Gamma_1^{\#2}{}^{+a\beta}$ | $-\frac{a_0+2a_1-3a_2}{2\sqrt{2}}$ | $\frac{1}{2}(-2a_1+a_2)$ | $\frac{2a_1+a_2+a_9}{2\sqrt{2}}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\Gamma_1^{\#3}{}^{+a\beta}$ | $\frac{1}{4}(-2a_1-a_2-a_9)$ | $\frac{2a_1+a_2+a_9}{2\sqrt{2}}$ | $\frac{3}{4}(a_0-4a_1-2a_2-3a_3+16a_6-4a_7-2a_9)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\Gamma_1^{\#1}{}^{\alpha}$ | 0 | 0 | 0 | $\frac{1}{4}(-a_0-2a_1-a_2-2a_3)$ | $\frac{a_0+a_3}{2\sqrt{2}}$ | 0 | 0 | $-\frac{2a_1+a_2+a_9}{2\sqrt{6}}$ | $\frac{2a_1+a_2+a_9}{4\sqrt{3}}$ | 0 |
| $\Gamma_1^{\#2}{}^{\alpha}$ | 0 | 0 | 0 | 0 | $\frac{a_0+a_3}{2\sqrt{2}}$ | $\frac{1}{4}(-2a_1-a_2-a_3)$ | 0 | $-\frac{2a_1+a_2+a_9}{2\sqrt{3}}$ | $\frac{2a_1+a_2+a_9}{2\sqrt{6}}$ | 0 |
| $\Gamma_1^{\#3}{}^{\alpha}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5}{2}(a_0+4a_6-4a_7)$ | $\frac{1}{2}\sqrt{5}(a_0+4a_6-4a_7)$ | 0 | 0 | 0 |
| $\Gamma_1^{\#4}{}^{\alpha}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{2}\sqrt{5}(a_0+4a_6-4a_7)$ | $-\frac{a_0}{2}-2a_6+2a_7$ | 0 | 0 | 0 |
| $\Gamma_1^{\#5}{}^{\alpha}$ | 0 | 0 | 0 | $-\frac{2a_1+a_2+a_9}{2\sqrt{6}}$ | $-\frac{2a_1+a_2+a_9}{2\sqrt{3}}$ | 0 | 0 | $\frac{1}{2}(a_0-4a_1-2a_2-3a_3+16a_6-4a_7-2a_9)$ | $-\frac{a_0+4a_1+2a_2+3a_3-16a_6+4a_7+2a_9}{2\sqrt{2}}$ | 0 |
| $\Gamma_1^{\#6}{}^{\alpha}$ | 0 | 0 | 0 | $\frac{2a_1+a_2+a_9}{4\sqrt{3}}$ | $\frac{2a_1+a_2+a_9}{2\sqrt{6}}$ | 0 | 0 | $-\frac{a_0+4a_1+2a_2+3a_3-16a_6+4a_7+2a_9}{2\sqrt{2}}$ | $\frac{1}{4}(a_0-4a_1-2a_2-3a_3+16a_6-4a_7-2a_9)$ | 0 |
| $h_1^{\#1}{}^{\alpha}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Lagrangian density | |
|---|---|
| $ \begin{aligned} &\frac{2}{3}a_1\Gamma_a^X\chi^{\Gamma a\beta}+\frac{1}{3}a_2\Gamma_a^X\chi^{\Gamma a\beta}+\frac{1}{2}a_3\Gamma_a^X\chi^{\Gamma a\beta}-2a_6\Gamma_a^X\chi^{\Gamma a\beta}+ \\ &\frac{1}{3}a_9\Gamma_a\chi^{\Gamma a\beta}-\frac{1}{4}a_0\Gamma_{a\beta X}\Gamma^{\alpha\beta X}-\frac{3}{2}a_1\Gamma_{a\beta X}\Gamma^{\alpha\beta X}-\frac{1}{2}a_2\Gamma_{a\beta X}\Gamma^{\alpha\beta X}- \\ &\frac{3}{4}a_3\Gamma_{a\beta X}\Gamma^{\alpha\beta X}+2a_6\Gamma_{a\beta X}\Gamma^{\alpha\beta X}+a_7\Gamma_{a\beta X}\Gamma^{\alpha\beta X}-\frac{1}{2}a_9\Gamma_{a\beta X}\Gamma^{\alpha\beta X}- \\ &\frac{1}{4}a_0\Gamma_{a\beta X}\Gamma^{\alpha\beta X}-\frac{1}{2}a_1\Gamma_{a\beta X}\Gamma^{\alpha\beta X}-\frac{3}{4}a_2\Gamma_{a\beta X}\Gamma^{\alpha\beta X}-\frac{3}{4}a_3\Gamma_{a\beta X}\Gamma^{\alpha\beta X}+ \\ &2a_6\Gamma_{a\beta X}\Gamma^{\alpha\beta X}+a_7\Gamma_{a\beta X}\Gamma^{\alpha\beta X}-\frac{1}{2}a_9\Gamma_{a\beta X}\Gamma^{\alpha\beta X}-\frac{1}{2}a_0\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}+ \\ &\frac{1}{4}a_1\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}-\frac{3}{8}a_2\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}+\frac{3}{8}a_3\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}-4a_6\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}+ \\ &\frac{5}{2}a_7\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}-\frac{5}{2}a_0\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}+\frac{1}{2}a_1\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}+\frac{5}{2}a_2\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}+ \\ &\frac{3}{4}a_3\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}-8a_6\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}+5a_7\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}+\frac{1}{2}a_9\Gamma^{\alpha\beta X}\Gamma_{\beta\alpha X}+ \\ &\frac{1}{2}a_0\Gamma^{\alpha\beta}\Gamma_{\beta X}-a_1\Gamma^{\alpha\beta}\Gamma_{\beta X}-\frac{1}{2}a_2\Gamma^{\alpha\beta}\Gamma_{\beta X}-\frac{1}{2}a_3\Gamma^{\alpha\beta}\Gamma_{\beta X}+ \\ &4a_6\Gamma^{\alpha\beta}\Gamma_{\beta X}-2a_7\Gamma^{\alpha\beta}\Gamma_{\beta X}-\frac{1}{2}a_9\Gamma^{\alpha\beta}\Gamma_{\beta X}+\frac{1}{2}a_0\Gamma^{\alpha\beta}a\Gamma_{\beta X}- \\ &\frac{1}{3}a_1\Gamma^{\alpha\beta}a\Gamma_{\beta X}-\frac{1}{6}a_2\Gamma^{\alpha\beta}a\Gamma_{\beta X}-\frac{1}{3}a_3\Gamma^{\alpha\beta}a\Gamma_{\beta X}+4a_6\Gamma^{\alpha\beta}a\Gamma_{\beta X}- \\ &2a_7\Gamma^{\alpha\beta}a\Gamma_{\beta X}-\frac{1}{2}a_9\Gamma^{\alpha\beta}a\Gamma_{\beta X}-\frac{1}{2}a_0\Gamma^{\alpha\beta X}\Gamma_{X\beta\alpha}+\frac{5}{4}a_1\Gamma^{\alpha\beta X}\Gamma_{X\beta\alpha}+ \\ &\frac{1}{8}a_2\Gamma^{\alpha\beta X}\Gamma_{X\beta\alpha}+\frac{3}{8}a_3\Gamma^{\alpha\beta X}\Gamma_{X\beta\alpha}-4a_6\Gamma^{\alpha\beta X}\Gamma_{X\beta\alpha}+\frac{5}{2}a_7\Gamma^{\alpha\beta X}\Gamma_{X\beta\alpha}+ \\ &\frac{1}{2}a_9\Gamma^{\alpha\beta X}\Gamma_{X\beta\alpha}+\frac{1}{2}a_0\Gamma^{\alpha\beta}\Gamma_{\beta X}+\frac{1}{3}a_1\Gamma^{\alpha\beta}\Gamma_{\beta X}+\frac{1}{6}a_2\Gamma^{\alpha\beta}\Gamma_{\beta X}+ \\ &\frac{1}{2}a_3\Gamma^{\alpha\beta}\Gamma_{\beta X}-a_7\Gamma^{\alpha\beta}\Gamma_{\beta X}+\frac{5}{6}a_9\Gamma^{\alpha\beta}\Gamma_{\beta X}-\frac{1}{2}a_7\Gamma^{\alpha\beta}a\Gamma_{\beta X}+ \\ &\frac{1}{3}a_1\Gamma^{\alpha\beta}a\Gamma_{\beta X}+\frac{1}{6}a_2\Gamma^{\alpha\beta}a\Gamma_{\beta X}-\frac{1}{2}a_7\Gamma^{\alpha\beta}a\Gamma_{\beta X}+\frac{1}{6}a_9\Gamma^{\alpha\beta}a\Gamma_{\beta X}- \\ &\frac{1}{2}a_0\Gamma^{\alpha\beta X}\partial_{\beta}h_{\alpha X}-\frac{1}{4}a_0\Gamma^{\alpha\beta}a\partial_{\beta}h_X^X+\frac{1}{4}a_0\Gamma^{\alpha\beta}a\partial_{\beta}h_X^X-\frac{1}{4}a_0h^Xa\partial_{\beta}h^{\alpha\beta}+ \\ &\frac{1}{4}a_0h^Xa\partial_{\beta}h^{\alpha\beta}-\frac{1}{2}a_0h_{\alpha X}\partial_{\beta}h^{\alpha\beta X}+\frac{1}{2}a_0h^{\alpha\beta}\partial_{\beta}\partial_{\alpha}h_X^X-\frac{1}{2}a_0\partial_{\beta}h_X^X\partial^{\beta}h^{\alpha\alpha}+ \\ &\frac{1}{2}a_0\Gamma^{\alpha\beta}a\partial_{\beta}h_X^X+\frac{1}{4}a_0\partial_{\beta}h^{\alpha\alpha}a\partial_Xh_{\beta}^X-\frac{1}{2}a_0h^{\alpha\beta}\partial_X\partial_{\beta}h_X^X+\frac{1}{4}a_0h^{\alpha}a\partial_X\partial_{\beta}h^{\beta X}+ \\ &\frac{1}{4}a_0h^{\alpha\beta}\partial_X\partial_{\beta}h_{\alpha\beta}-\frac{1}{4}a_0h^{\alpha}a\partial_X\partial_{\beta}h^{\beta\beta}-\frac{1}{4}a_0\partial_{\beta}h_{\alpha X}\partial^{\alpha}h^{\alpha\beta}+ \\ &\frac{1}{2}a_0\partial_Xh_{\alpha\beta}\partial^{\alpha}h^{\alpha\beta}+\frac{1}{2}a_0h_{\beta X}\partial^X\Gamma^{\alpha\beta}+2c_1\partial_{\alpha}\Gamma_{\beta\gamma\mu}\partial^{\mu}\Gamma^{\alpha\beta X}- \\ &2c_1\partial_{\alpha}\Gamma_{\beta\gamma\mu}\partial^{\mu}\Gamma^{\alpha\beta X}-2c_1\partial_{\alpha}\Gamma_{X\beta\mu}\partial^{\mu}\Gamma^{\alpha\beta X}+2c_1\partial_{\alpha}\Gamma_{X\mu\beta}\partial^{\mu}\Gamma^{\alpha\beta X}+ \\ &c_1\partial_{\alpha}\Gamma_{\mu\beta X}\partial^{\mu}\Gamma^{\alpha\beta X}-c_1\partial_{\alpha}\Gamma_{\mu\beta X}\partial^{\mu}\Gamma^{\alpha\beta X}-2c_1\partial_{\beta}\partial_{\alpha\mu}\partial^{\mu}\Gamma^{\alpha\beta X}+ \\ &c_1\partial_{\beta}\partial_{\alpha\mu}\partial^{\mu}\Gamma^{\alpha\beta X}-c_1\partial_{\beta}\Gamma_{X\mu\alpha}\partial^{\mu}\Gamma^{\alpha\beta X}+c_1\partial_X\Gamma_{\alpha\beta\mu}\partial^{\mu}\Gamma^{\alpha\beta X}- \\ &c_1\partial_X\Gamma_{\beta\mu\alpha}\partial^{\mu}\Gamma^{\alpha\beta X}+2c_1\partial_X\Gamma_{\beta\mu\alpha}\partial^{\mu}\Gamma^{\alpha\beta X}-c_1\partial_X\Gamma_{\alpha\beta X}\partial^{\mu}\Gamma^{\alpha\beta X}+ \\ &c_1\partial_X\Gamma_{\alpha\beta X}\partial^{\mu}\Gamma^{\alpha\beta X}+c_1\partial_X\Gamma_{\beta\alpha X}\partial^{\mu}\Gamma^{\alpha\beta X}-2c_1\partial_X\Gamma_{\beta\alpha X}\partial^{\mu}\Gamma^{\alpha\beta X}+ \\ &c_1\partial_X\Gamma_{X\beta\alpha}\partial^{\mu}\Gamma^{\alpha\beta X}+c_1\partial_X\partial_{\beta}h_{\alpha\mu}\partial^{\mu}\partial^{\alpha}h^{\alpha\beta}-c_1\partial_X\partial_{\beta}h_{\alpha X}\partial^{\mu}\partial^{\alpha}h^{\alpha\beta} \end{aligned} $ | |
| Added source term: | $h^{\alpha\beta}\mathcal{T}_{\alpha\beta}+\Gamma^{\alpha\beta X}\Delta_{\alpha\beta X}$ |

| | $\Delta_2^{\#1}{}^{+a\beta}$ | $\Delta_2^{\#2}{}^{+a\beta}$ | $\Delta_2^{\#3}{}^{+a\beta}$ | $\mathcal{T}_2^{\#1}{}^{+a\beta}$ | $\Delta_2^{\#1}{}^{+a\beta X}$ | $\Delta_2^{\#2}{}^{+a\beta X}$ |
|-----------------------------------|--|--------------------------------|--|-----------------------------------|--|--|
| $\Delta_2^{\#1}{}^{+a\beta}$ | $\frac{4(a_0-4a_1-2a_2-3a_3+16a_6-4a_7-2a_9)}{a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)+a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9)}$ | 0 | $\frac{4(2a_1+a_2+a_9)}{\sqrt{3}(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)+a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ | 0 | 0 | 0 |
| $\Delta_2^{\#2}{}^{+a\beta}$ | 0 | $-\frac{1}{3(a_0+4a_6)+12a_7}$ | 0 | 0 | 0 | 0 |
| $\Delta_2^{\#3}{}^{+a\beta}$ | $\frac{4(2a_1+a_2+a_9)}{\sqrt{3}(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)+a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ | 0 | $\frac{4(a_0+2a_1+a_2)}{3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)+a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ | 0 | 0 | 0 |
| $\mathcal{T}_2^{\#1}{}^{+a\beta}$ | 0 | 0 | 0 | $-\frac{8}{a_0k^2}$ | 0 | 0 |
| $\Delta_2^{\#1}{}^{+a\beta X}$ | 0 | 0 | 0 | 0 | $\frac{4(a_0-4a_1-2a_2-3a_3+16a_6-4a_7-2a_9)}{a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)+a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9)}$ | $\frac{4(2a_1+a_2+a_9)}{\sqrt{3}(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)+a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ |
| $\Delta_2^{\#2}{}^{+a\beta X}$ | 0 | 0 | 0 | 0 | $\frac{4(2a_1+a_2+a_9)}{\sqrt{3}(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)+a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ | $\frac{4(a_0+2a_1+a_2)}{3(a_0^2+(2a_1+a_2)(2a_1+a_2+3a_3-16a_6+4a_7)+a_9^2-a_0(6a_1+3a_2+3a_3-16a_6+4a_7+2a_9))}$ |

| | $\Gamma_2^{\#1}{}^{+a\beta}$ | $\Gamma_2^{\#2}{}^{+a\beta}$ | $\Gamma_2^{\#3}{}^{+a\beta}$ | $h_2^{\#1}{}^{+a\beta}$ | $\Gamma_2^{\#1}{}^{+a\beta X}$ | $\Gamma_2^{\#2}{}^{+a\beta X}$ |
|--------------------------------|--------------------------------------|------------------------------|---|-------------------------|--------------------------------------|---|
| $\Gamma_2^{\#1}{}^{+a\beta}$ | $\frac{1}{4}(a_0-2a_1-a_2)$ | 0 | $-\frac{1}{4}\sqrt{3}(2a_1+a_2+a_9)$ | 0 | 0 | 0 |
| $\Gamma_2^{\#2}{}^{+a\beta}$ | 0 | $-3(a_0+4a_6-4a_7)$ | 0 | 0 | 0 | 0 |
| $\Gamma_2^{\#3}{}^{+a\beta}$ | $-\frac{1}{4}\sqrt{3}(2a_1+a_2+a_9)$ | 0 | $\frac{3}{4}(a_0-4a_1-2a_2-3a_3+16a_6-4a_7-2a_9)$ | 0 | 0 | 0 |
| $h_2^{\#1}{}^{+a\beta}$ | 0 | 0 | 0 | $-\frac{a_0k^2}{8}$ | 0 | 0 |
| $\Gamma_2^{\#1}{}^{+a\beta X}$ | 0 | 0 | 0 | 0 | $\frac{1}{4}(a_0-2a_1-a_2)$ | $-\frac{1}{4}\sqrt{3}(2a_1+a_2+a_9)$ |
| $\Gamma_2^{\#2}{}^{+a\beta X}$ | 0 | 0 | 0 | 0 | $-\frac{1}{4}\sqrt{3}(2a_1+a_2+a_9)$ | $\frac{3}{4}(a_0-4a_1-2a_2-3a_3+16a_6-4a_7-2a_9)$ |

| Source constraints | |
|---|----|
| SO(3) irreps | # |
| $\mathcal{T}_{0+}^{\#2} = 0$ | 1 |
| $\Delta_{0+}^{\#4} = 0$ | 1 |
| $\Delta_{0+}^{\#3} + 3\Delta_{0+}^{\#2} = 0$ | 1 |
| $\mathcal{T}_{1-}^{\#1,\alpha} = 0$ | 3 |
| $\Delta_{1-}^{\#6\alpha} + \Delta_{1-}^{\#5\alpha} = 0$ | 3 |
| $\Delta_{1-}^{\#4\alpha} + \Delta_{1-}^{\#3\alpha} = 0$ | 3 |
| Total #: | 12 |

| $\Gamma_3^{\#1}{}^{+a\beta X}$ |
|--------------------------------|
| $-\frac{1}{3}(a_0+4a_6-4a_7)$ |
| $\Delta_3^{\#1}{}^{+a\beta X}$ |
| $-\frac{1}{3(a_0+4a_6)+12a_7}$ |

| Massive particle |
|---|
| Pole residue: $\frac{1}{6c_1}>0$ |
| Polarisations: 1 |
| Square mass: $-\frac{a_0+4a_1-4a_2}{12c_1}>0$ |
| Spin: 0 |
| Parity: Odd |

| Quadratic pole |
|----------------------------------|
| Pole residue: $-\frac{1}{a_0}>0$ |
| Polarisations: 2 |

| Unitarity conditions |
|---|
| $a_0<0$ && $a_2>\frac{1}{4}(a_0+4a_1)$ && $c_1>0$ |