



$r_2 < 0 \&\& t_2 > 0$

Lagrangian density

$$\begin{aligned} &-\frac{1}{3}t_1\omega_{\kappa}^{\alpha'}\omega_{\kappa\alpha}^{\kappa}+\frac{2}{3}t_3\omega_{\kappa}^{\alpha'}\omega_{\kappa\alpha}^{\kappa}-\frac{1}{3}t_1\omega_{\kappa}^{\kappa\lambda}\omega_{\kappa\lambda}^{\kappa\lambda}+\frac{2}{3}t_2\omega_{\kappa}^{\kappa\lambda}\omega_{\kappa\lambda}^{\kappa\lambda}+\frac{1}{3}t_1\omega_{\kappa\lambda}^{\kappa\lambda}\omega_{\kappa\lambda}^{\kappa\lambda}+\frac{1}{3}t_2\omega_{\kappa\lambda}^{\kappa\lambda}\omega_{\kappa\lambda}^{\kappa\lambda}+f^{\alpha\beta}\tau_{\alpha\beta}+\omega^{\alpha\beta\chi}\sigma_{\alpha\beta\chi}+\\ &\frac{2}{3}r_2\partial^\beta\omega_{\kappa}^{\theta\alpha}\partial_\theta\omega_{\alpha\beta}^{\kappa}-\frac{1}{3}r_2\partial_\theta\omega_{\alpha\beta}^{\kappa}\partial_\kappa\omega^{\alpha\beta\theta}-\frac{2}{3}r_2\partial_\theta\omega_{\alpha\beta}^{\kappa}\partial_\kappa\omega^{\theta\alpha\beta}-\\ &\frac{1}{3}t_1\partial^\alpha f_{\theta\kappa}^{\kappa}\partial^\kappa f_{\alpha}^{\theta}+\frac{1}{6}t_2\partial^\alpha f_{\theta\kappa}^{\kappa}\partial^\kappa f_{\alpha}^{\theta}-\frac{2}{3}t_1\partial^\alpha f_{\kappa\theta}^{\kappa}\partial^\kappa f_{\alpha}^{\theta}-\frac{1}{6}t_2\partial^\alpha f_{\kappa\theta}^{\kappa}\partial^\kappa f_{\alpha}^{\theta}-\\ &\frac{1}{3}t_1\partial^\alpha f_{\kappa}^{\lambda}\partial^\kappa f_{\alpha\lambda}^{\lambda}+\frac{1}{6}t_2\partial^\alpha f_{\kappa}^{\lambda}\partial^\kappa f_{\alpha\lambda}^{\lambda}+\frac{1}{3}t_1\omega_{\kappa\alpha}^{\alpha}\partial^\kappa f_{\kappa}^{\lambda}-\frac{2}{3}t_3\omega_{\kappa\alpha}^{\alpha}\partial^\kappa f_{\kappa}^{\lambda}+\\ &\frac{1}{3}t_1\omega_{\kappa\lambda}^{\lambda}\partial^\kappa f_{\kappa}^{\lambda}-\frac{2}{3}t_3\omega_{\kappa\lambda}^{\lambda}\partial^\kappa f_{\kappa}^{\lambda}+\frac{2}{3}t_1\partial^\alpha f_{\kappa\alpha}^{\lambda}\partial^\kappa f_{\kappa}^{\lambda}-\frac{4}{3}t_3\partial^\alpha f_{\kappa\alpha}^{\lambda}\partial^\kappa f_{\kappa}^{\lambda}-\\ &\frac{1}{3}t_1\partial_\kappa f_{\lambda}^{\lambda}\partial^\kappa f_{\kappa}^{\lambda}+\frac{2}{3}t_3\partial_\kappa f_{\lambda}^{\lambda}\partial^\kappa f_{\kappa}^{\lambda}+\frac{1}{3}t_1\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}+\frac{1}{3}t_2\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}+\frac{1}{3}t_2\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}+\frac{1}{3}t_2\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}-\\ &\frac{4}{3}t_1\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}-\frac{2}{3}t_2\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}-\frac{1}{3}t_1\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}-\frac{1}{3}t_2\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}+\frac{2}{3}t_1\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}-\\ &\frac{2}{3}t_1\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}+\frac{2}{3}t_2\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}-\frac{1}{3}t_1\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}+\frac{2}{3}t_3\omega_{\kappa\theta}^{\kappa}\partial^\kappa f_{\kappa}^{\lambda}-\\ &\frac{1}{3}t_1\omega_{\kappa\lambda}^{\lambda}\partial^\kappa f_{\kappa}^{\lambda}+\frac{2}{3}t_3\omega_{\kappa\lambda}^{\lambda}\partial^\kappa f_{\kappa}^{\lambda}+\frac{1}{3}t_1\partial^\alpha f_{\kappa}^{\lambda}\partial^\kappa f_{\kappa}^{\lambda}-\frac{1}{6}t_2\partial^\alpha f_{\kappa}^{\lambda}\partial^\kappa f_{\kappa}^{\lambda}+\frac{1}{3}t_1\partial_\kappa f_{\theta}^{\lambda}\partial^\kappa f_{\lambda}^{\theta}+\frac{2}{3}t_2\partial_\kappa f_{\theta}^{\lambda}\partial^\kappa f_{\lambda}^{\theta}-\\ &\frac{1}{3}t_1\partial_\kappa f_{\theta}^{\lambda}\partial^\kappa f_{\lambda}^{\theta}-\frac{1}{6}t_2\partial_\kappa f_{\theta}^{\lambda}\partial^\kappa f_{\lambda}^{\theta}+\frac{2}{3}t_1\partial_\kappa f_{\theta}^{\lambda}\partial^\kappa f_{\lambda}^{\theta}+\frac{1}{6}t_2\partial_\kappa f_{\theta}^{\lambda}\partial^\kappa f_{\lambda}^{\theta}-\\ &\frac{1}{3}t_1\partial^\alpha f_{\alpha}^{\lambda}\partial^\kappa f_{\lambda\kappa}^{\lambda}+\frac{2}{3}t_3\partial^\alpha f_{\alpha}^{\lambda}\partial^\kappa f_{\lambda\kappa}^{\lambda}+\frac{1}{3}r_2\partial_\kappa\omega^{\alpha\beta\theta}\partial^\kappa\omega_{\alpha\beta\theta}+\\ &\frac{2}{3}r_2\partial_\kappa\omega^{\theta\alpha\beta}\partial^\kappa\omega_{\alpha\beta\theta}-\frac{2}{3}r_2\partial^\beta\omega_{\kappa}^{\alpha\lambda}\partial_\lambda\omega_{\alpha\beta}^{\kappa}+\frac{2}{3}r_2\partial^\beta\omega_{\kappa}^{\lambda\alpha}\partial_\lambda\omega_{\alpha\beta}^{\kappa} \end{aligned}$$

Massive particle

Pole residue:	$-\frac{1}{r_2} > 0$
Polarisations:	1
Square mass:	$-\frac{t_2}{r_2} > 0$
Spin:	0
Parity:	Odd

(No massless particles)

	$\sigma_{2^+}^{\#1} \dagger^{\alpha\beta}$	$\tau_{2^+}^{\#1} \dagger^{\alpha\beta}$	$\sigma_{2^-}^{\#1} \dagger^{\alpha\beta\chi}$
$\sigma_{2^+}^{\#1} \dagger^{\alpha\beta}$	$\frac{2}{(1+2k^2)^2 t_1}$	$-\frac{2i\sqrt{2}k}{(1+2k^2)^2 t_1}$	0
$\tau_{2^+}^{\#1} \dagger^{\alpha\beta}$	$\frac{2i\sqrt{2}k}{(1+2k^2)^2 t_1}$	$\frac{4k^2}{(1+2k^2)^2 t_1}$	0
$\sigma_{2^-}^{\#1} \dagger^{\alpha\beta\chi}$	0	0	$\frac{2}{t_1}$

	$\omega_{0^+}^{\#1}$	$f_{0^+}^{\#1}$	$f_{0^+}^{\#2}$	$\omega_{0^-}^{\#1}$
$\omega_{0^+}^{\#1} \dagger$	$t_3$	$-i\sqrt{2}kt_3$	0	0
$f_{0^+}^{\#1} \dagger$	$i\sqrt{2}kt_3$	$2k^2t_3$	0	0
$f_{0^+}^{\#2} \dagger$	0	0	0	0
$\omega_{0^-}^{\#1} \dagger$	0	0	0	$k^2r_2+t_2$

Source constraints

#	#	#	#	#	#	#	#
SO(3) irreps	1	1	3	3	3	5	16
$\tau_{0^+}^{\#2} == 0$							
$\tau_{0^+}^{\#1} - 2ik\sigma_{0^+}^{\#1} == 0$							
$\tau_{1^-}^{\#2\alpha} + 2ik\sigma_{1^-}^{\#2\alpha} == 0$							
$\tau_{1^-}^{\#1\alpha} == 0$							
$\tau_{1^+}^{\#1\alpha\beta} + ik\sigma_{1^+}^{\#2\alpha\beta} == 0$							
$\tau_{2^+}^{\#1\alpha\beta} - 2ik\sigma_{2^+}^{\#1\alpha\beta} == 0$							
Total #:							

	$\sigma_{0^+}^{\#1}$	$\tau_{0^+}^{\#1}$	$\tau_{0^+}^{\#2}$	$\sigma_{0^-}^{\#1}$
$\sigma_{0^+}^{\#1} \dagger$	$\frac{1}{(1+2k^2)^2 t_3}$	$-\frac{i\sqrt{2}k}{(1+2k^2)^2 t_3}$	0	0
$\tau_{0^+}^{\#1} \dagger$	$\frac{i\sqrt{2}k}{(1+2k^2)^2 t_3}$	$\frac{2k^2}{(1+2k^2)^2 t_3}$	0	0
$\tau_{0^+}^{\#2} \dagger$	0	0	0	0
$\sigma_{0^-}^{\#1} \dagger$	0	0	0	$\frac{1}{k^2r_2+t_2}$

	$\omega_{2^+}^{\#1} \dagger^{\alpha\beta}$	$f_{2^+}^{\#1} \dagger^{\alpha\beta}$	$\omega_{2^-}^{\#1} \dagger^{\alpha\beta\chi}$
$\omega_{2^+}^{\#1} \dagger^{\alpha\beta}$	$\frac{t_1}{2}$	$-\frac{ikt_1}{\sqrt{2}}$	0
$f_{2^+}^{\#1} \dagger^{\alpha\beta}$	$\frac{ikt_1}{\sqrt{2}}$	$k^2t_1$	0
$\omega_{2^-}^{\#1} \dagger^{\alpha\beta\chi}$	0	0	$\frac{t_1}{2}$

	$\omega_{1^+}^{\#1} \dagger^{\alpha\beta}$	$\omega_{1^+}^{\#2} \dagger^{\alpha\beta}$	$f_{1^+}^{\#1} \dagger^{\alpha\beta}$	$\omega_{1^-}^{\#1} \dagger^{\alpha}$	$\omega_{1^-}^{\#2} \dagger^{\alpha}$	$f_{1^-}^{\#1} \dagger^{\alpha}$	$f_{1^-}^{\#2} \dagger^{\alpha}$
$\omega_{1^+}^{\#1} \dagger^{\alpha\beta}$	$\frac{1}{6}(t_1+4t_2)$	$-\frac{t_1-2t_2}{3\sqrt{2}}$	$-\frac{ik(t_1-2t_2)}{3\sqrt{2}}$	0	0	0	0
$\omega_{1^+}^{\#2} \dagger^{\alpha\beta}$	$-\frac{t_1-2t_2}{3\sqrt{2}}$	$\frac{t_1+t_2}{3}$	$\frac{1}{3}ik(t_1+t_2)$	0	0	0	0
$f_{1^+}^{\#1} \dagger^{\alpha\beta}$	$\frac{ik(t_1-2t_2)}{3\sqrt{2}}$	$-\frac{1}{3}ik(t_1+t_2)$	$\frac{1}{3}k^2(t_1+t_2)$	0	0	0	0
$\omega_{1^-}^{\#1} \dagger^{\alpha}$	0	0	0	$\frac{1}{6}(t_1+4t_3)$	$\frac{t_1-2t_3}{3\sqrt{2}}$	0	$\frac{1}{3}ik(t_1-2t_3)$
$\omega_{1^-}^{\#2} \dagger^{\alpha}$	0	0	0	$\frac{t_1-2t_3}{3\sqrt{2}}$	$\frac{t_1+t_3}{3}$	0	$\frac{1}{3}i\sqrt{2}k(t_1+t_3)$
$f_{1^-}^{\#1} \dagger^{\alpha}$	0	0	0	0	0	0	0
$f_{1^-}^{\#2} \dagger^{\alpha}$	0	0	0	$-\frac{1}{3}ik(t_1-2t_3)$	$-\frac{1}{3}i\sqrt{2}k(t_1+t_3)$	0	$\frac{2}{3}k^2(t_1+t_3)$

	$\sigma_{1^+}^{\#1} \dagger^{\alpha\beta}$	$\sigma_{1^+}^{\#2} \dagger^{\alpha\beta}$	$\tau_{1^+}^{\#1} \dagger^{\alpha\beta}$	$\sigma_{1^-}^{\#1} \dagger^{\alpha}$	$\sigma_{1^-}^{\#2} \dagger^{\alpha}$	$\tau_{1^-}^{\#1} \dagger^{\alpha}$	$\tau_{1^-}^{\#2} \dagger^{\alpha}$
$\sigma_{1^+}^{\#1} \dagger^{\alpha\beta}$	$\frac{2(t_1+t_2)}{3t_1t_2}$	$\frac{\sqrt{2}(t_1-2t_2)}{3(1+k^2)t_1t_2}$	$\frac{i\sqrt{2}k(t_1-2t_2)}{3(1+k^2)t_1t_2}$	0	0	0	0
$\sigma_{1^+}^{\#2} \dagger^{\alpha\beta}$	$\frac{\sqrt{2}(t_1-2t_2)}{3(1+k^2)t_1t_2}$	$\frac{t_1+4t_2}{3(1+k^2)^2t_1t_2}$	$\frac{ik(t_1+4t_2)}{3(1+k^2)^2t_1t_2}$	0	0	0	0
$\tau_{1^+}^{\#1} \dagger^{\alpha\beta}$	$-\frac{i\sqrt{2}k(t_1-2t_2)}{3(1+k^2)t_1t_2}$	$-\frac{ik(t_1+4t_2)}{3(1+k^2)^2t_1t_2}$	$-\frac{k^2(t_1+4t_2)}{3(1+k^2)^2t_1t_2}$	$\frac{2(t_1+t_3)}{3t_1t_3}$	$-\frac{\sqrt{2}(t_1-2t_3)}{3(1+2k^2)t_1t_3}$	$-\frac{2ikt_1-4ikt_3}{3t_1t_3+6k^2t_1t_3}$	$-\frac{2ikt_1-4ikt_3}{3t_1t_3+6k^2t_1t_3}$
$\sigma_{1^-}^{\#1} \dagger^{\alpha}$	0	0	0	0	0	0	0
$\sigma_{1^-}^{\#2} \dagger^{\alpha}$	0	0	0	0	0	0	0
$\tau_{1^-}^{\#1} \dagger^{\alpha}$	0	0	0	0	0	0	0
$\tau_{1^-}^{\#2} \dagger^{\alpha}$	0	0	0	$-\frac{2ikt_1-4ikt_3}{3t_1t_3+6k^2t_1t_3}$	$-\frac{i\sqrt{2}k(t_1+4t_3)}{3(1+2k^2)^2t_1t_3}$	$-\frac{2k^2(t_1+4t_3)}{3(1+2k^2)^2t_1t_3}$	$-\frac{2k^2(t_1+4t_3)}{3(1+2k^2)^2t_1t_3}$