



Quadratic pole

Pole residue: $\frac{1}{\beta_1^2} \vee 0$

Polarisations: 2

$\beta_1 < 0 \parallel \beta_1 > 0$

Unitarity conditions

(No massive particles)

Lagrangian density

$$\begin{aligned} &-2\beta_1^2\omega_{\alpha\beta}^X\omega^{\alpha\beta X}-2\beta_1^2\omega_\alpha^{X\delta}\omega_\alpha^{X\delta}-2\beta_1^2\omega_\alpha^X\omega_\alpha^X\partial_\beta f^{\alpha\beta}- \\ &2\beta_1^2\omega_\alpha^\delta\partial_\delta\omega_\beta f^{\alpha\beta}-4\beta_1^2f^{\alpha\beta}\partial_\beta\omega_\alpha^X+4\beta_1^2\partial_\beta\omega_\alpha^{\alpha\beta}+ \\ &\frac{2}{3}\partial^\alpha\omega_\beta^\zeta\partial_\beta\omega_\alpha^X+2\beta_1^2\omega_\beta^X\partial_\beta f^\alpha_\alpha+2\beta_1^2\omega_\beta^\delta\partial_\beta f^\alpha_\alpha- \\ &2\beta_1^2\partial_\beta f^\beta_X\partial_\beta f^\alpha_\alpha+4\beta_1^2f^{\alpha\beta}\partial_X\omega_\alpha^\beta-4\beta_1^2f^\alpha_\alpha\partial_X\omega_\beta^{\beta X}- \\ &\frac{2}{3}\partial_\beta\omega_\alpha^X\partial_X\omega_\beta^{\beta\zeta\alpha}-\frac{1}{3}\partial_\beta\omega_\alpha^X\partial_X\omega_\beta^{\zeta\alpha\beta}+4\beta_1^2\omega_{\alpha\chi\beta}\partial_X f^{\alpha\beta}+ \\ &\beta_1^2\partial_X f_\beta^\delta\partial_X f_\delta^\beta+\beta_1^2\partial_X f_\beta^\delta\partial_X f_\delta^\beta+\frac{2}{3}\partial_X\omega_\beta^{\beta\zeta\alpha}\partial_X\omega_\alpha^{\zeta\alpha\beta}+ \\ &\frac{1}{3}\partial_X\omega_\alpha^{\zeta\alpha\beta}\partial_X\omega_\beta^{\zeta\alpha\beta}+4\beta_1^2\partial_\beta f^\alpha_\alpha\partial_\delta f_\beta^\delta-2\beta_1^2\partial_\beta f_\beta^X\partial_\delta f_\alpha^{\delta X}+ \\ &\frac{2}{3}\partial^\beta\omega_\alpha^{\delta\zeta}\partial_\delta\omega_\beta^{\zeta\beta}_\alpha-\frac{2}{3}\partial^\beta\omega_\alpha^{\zeta\delta}\partial_\delta\omega_\beta^{\zeta\beta}_\alpha-\beta_1^2\partial_X f_\beta^{\beta\zeta}\partial_X f_\zeta^{\zeta\beta}_\beta- \\ &\beta_1^2\partial_X f_\beta^{\beta\zeta}\partial_X f_\zeta^{\zeta\beta}_\beta+\beta_1^2\partial_X f_\beta^{\delta\zeta}\partial_X f_\zeta^{\delta\beta}_\beta-\beta_1^2\partial_X f_\beta^{\zeta\delta}\partial_X f_\delta^{\delta\zeta}_\beta \end{aligned}$$

Added source term: $f^{\alpha\beta}\tau_{\alpha\beta}+\omega^{\alpha\beta\chi}\sigma_{\alpha\beta\chi}$

$\omega_{1+}^{\#1}+\alpha\beta$	0	0	0	0	0	0	0
$\omega_{1+}^{\#2}+\alpha\beta$	0	0	0	0	0	0	0
$f_{1+}^{\#1}+\alpha\beta$	0	0	0	0	0	0	0
$\omega_{1-}^{\#1}+\alpha$	0	0	0	0	0	0	0
$\omega_{1-}^{\#2}+\alpha$	0	0	0	0	0	0	0
$f_{1-}^{\#1}+\alpha$	0	0	0	0	0	0	0
$f_{1-}^{\#2}+\alpha$	0	0	0	0	0	0	0

$\sigma_{1+}^{\#1}+\alpha\beta$	0	0	0	0	0	0	0
$\sigma_{1+}^{\#2}+\alpha\beta$	0	0	0	0	0	0	0
$\tau_{1+}^{\#1}+\alpha\beta$	0	0	0	0	0	0	0
$\sigma_{1-}^{\#1}+\alpha$	0	0	0	0	0	0	0
$\sigma_{1-}^{\#2}+\alpha$	0	0	0	0	0	0	0
$\tau_{1-}^{\#1}+\alpha$	0	0	0	0	0	0	0
$\tau_{1-}^{\#2}+\alpha$	0	0	0	0	0	0	0

$\omega_{2+}^{\#1}+\alpha\beta$	0	0	0
$f_{2+}^{\#1}+\alpha\beta$	0	$2\beta_1^2k^2$	0
$\omega_{2-}^{\#1}+\alpha\beta\chi$	0	0	0

$\sigma_{0+}^{\#1}+$	0	0	0	0
$\tau_{0+}^{\#1}+$	0	$-\frac{1}{4\beta_1^2k^2}$	0	0
$\tau_{0+}^{\#2}+$	0	0	0	0
$\sigma_{0-}^{\#1}+$	0	0	0	$\frac{1}{k^2}$

$\omega_{0+}^{\#1}+$	0	0	0	0
$f_{0+}^{\#1}+$	0	$-4\beta_1^2k^2$	0	0
$f_{0+}^{\#2}+$	0	0	0	0
$\omega_{0-}^{\#1}+$	0	0	0	k^2

$\sigma_{2+}^{\#1}+\alpha\beta$	0	0	0
$\tau_{2+}^{\#1}+\alpha\beta$	0	$\frac{1}{2\beta_1^2k^2}$	0
$\sigma_{2-}^{\#1}+\alpha\beta\chi$	0	0	0

SO(3) irreps	#
$\tau_{0+}^{\#2}==0$	1
$\sigma_{0+}^{\#1}==0$	1
$\tau_{1-}^{\#2\alpha}==0$	3
$\tau_{1-}^{\#1\alpha}==0$	3
$\sigma_{1-}^{\#2\alpha}==0$	3
$\sigma_{1-}^{\#1\alpha}==0$	3
$\tau_{1+}^{\#1\alpha\beta}==0$	3
$\sigma_{1+}^{\#2\alpha\beta}==0$	3
$\sigma_{1+}^{\#1\alpha\beta}==0$	3
$\sigma_{2-}^{\#1\alpha\beta\chi}==0$	5
$\sigma_{2+}^{\#1\alpha\beta}==0$	5
Total #:	33