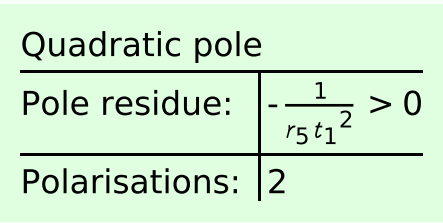


Wave operator and propagator

$$\begin{aligned}
& \text{Quadratic (free) action} \\
S = & \iiint \left(\frac{1}{6} (2 t_1 \omega_{\alpha}^{\alpha i} \omega_{i, \theta}^{\theta} + 6 f_{\alpha}^{\alpha \beta} \tau_{\alpha \beta} + 6 \omega^{\alpha \beta \chi} \sigma_{\alpha \beta \chi} - 4 t_1 \omega_{\alpha}^{\theta} \partial_{i f}^{\alpha i} + \right. \\
& 4 t_1 \omega_{i, \theta}^{\theta} \partial_{i f}^{\alpha} f_{\alpha}^{\theta} - 2 t_1 \partial_{i f}^{\theta} \partial_{\theta} f_{\alpha}^{\alpha} - 2 t_1 \partial_{i f}^{\alpha i} \partial_{\theta} f_{\alpha}^{\theta} + \\
& 4 t_1 \partial_{i f}^{\alpha} \partial_{\theta} f_{\alpha}^{\theta} - 6 t_1 \partial_{\alpha f}^{\theta} \partial_{i \theta}^{\theta} f_{\alpha}^{\alpha i} - 3 t_1 \partial_{\alpha f_{\theta i}}^{\theta} \partial_{\theta} f_{\alpha}^{\alpha i} + \\
& 3 t_1 \partial_{i f_{\alpha \theta}}^{\theta} \partial_{\theta} f_{\alpha}^{\alpha i} + 3 t_1 \partial_{\theta f_{\alpha i}}^{\theta} \partial_{\theta} f_{\alpha}^{\alpha i} + 3 t_1 \partial_{\theta f_{i \alpha}}^{\theta} \partial_{\theta} f_{\alpha}^{\alpha i} + \\
& 6 t_1 \omega_{\alpha \theta i} (\omega^{\alpha i \theta} + 2 \partial_{\theta} f_{\alpha}^{\alpha i}) + 8 r_2 \partial_{\beta} \omega_{\alpha i \theta} \partial^{\theta} \omega^{\alpha \beta i} - \\
& 4 r_2 \partial_{\beta} \omega_{\alpha \theta i} \partial^{\theta} \omega^{\alpha \beta i} + 4 r_2 \partial_{\beta} \omega_{i \theta \alpha} \partial^{\theta} \omega^{\alpha \beta i} - \\
& 2 r_2 \partial_{i \omega} \omega_{\alpha \beta \theta} \partial^{\theta} \omega^{\alpha \beta i} + 2 r_2 \partial_{\theta} \omega_{\alpha \beta i} \partial^{\theta} \omega^{\alpha \beta i} - \\
& 4 r_2 \partial_{\theta} \omega_{\alpha i \beta} \partial^{\theta} \omega^{\alpha \beta i} + 6 r_5 \partial_{i \omega}^{\kappa} \partial_{\kappa} \omega_{\alpha}^{\alpha i} - \\
& 6 r_5 \partial_{\theta} \omega_{i, \kappa}^{\kappa} \partial_{\alpha}^{\theta} \omega^{\alpha i} - 6 r_5 \partial_{\alpha} \omega^{\alpha i \theta} \partial_{\kappa} \omega_{i, \theta}^{\kappa} + \\
& 12 r_5 \partial^{\theta} \omega_{\alpha}^{\alpha i} \partial_{\kappa} \omega_{i, \theta}^{\kappa} + 6 r_5 \partial_{\alpha} \omega^{\alpha i \theta} \partial_{\kappa} \omega_{\theta, i}^{\kappa} - \\
& \left. 12 r_5 \partial^{\theta} \omega_{\alpha}^{\alpha i} \partial_{\kappa} \omega_{\theta, i}^{\kappa} \right) [t, x, y, z] d z d y d x d t
\end{aligned}$$

$$\begin{array}{c} \sigma_2^{\#1} + \alpha\beta \\ \tau_2^{\#1} + \alpha\beta \\ \omega_2^{\#1} + \alpha\beta \end{array} \begin{array}{|c|c|c|} \hline 0 & 0 & \frac{2}{t_1} \\ \hline -\frac{2i\sqrt{2}k}{(1+2k^2)^2 t_1} & \frac{4k^2}{(1+2k^2)^2 t_1} & 0 \\ \hline \frac{2}{(1+2k^2)^2 t_1} & \frac{2i\sqrt{2}k}{(1+2k^2)^2 t_1} & 0 \\ \hline \end{array} \begin{array}{c} \omega_0^{\#1} \\ f_0^{\#1} \\ \tau_0^{\#1} \end{array} \begin{array}{|c|c|c|c|} \hline 0 & 0 & 0 & k^2 r_2 - t_1 \\ \hline 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 \\ \hline \end{array} \begin{array}{c} \sigma_0^{\#1} + \\ \tau_0^{\#1} + \\ \omega_0^{\#1} + \end{array} \begin{array}{|c|c|c|c|} \hline 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & \frac{1}{k^2 r_2 t_1} \\ \hline \end{array} \begin{array}{c} \omega_{2^+}^{\#1} + \alpha\beta \\ f_{2^+}^{\#1} + \alpha\beta \\ \omega_{2^-}^{\#1} + \alpha\beta \end{array} \begin{array}{|c|c|c|} \hline \frac{t_1}{2} & -\frac{i k t_1}{\sqrt{2}} & 0 \\ \hline \frac{i k t_1}{\sqrt{2}} & k^2 t_1 & 0 \\ \hline 0 & 0 & \frac{t_1}{2} \\ \hline \end{array} \begin{array}{c} \omega_{1^+}^{\#1} + \alpha\beta \\ \omega_{1^+}^{\#2} + \alpha\beta \\ f_{1^+}^{\#1} + \alpha\beta \\ \omega_{1^+}^{\#1} + \alpha \\ \omega_{1^+}^{\#2} + \alpha \\ f_{1^+}^{\#1} + \alpha \\ f_{1^+}^{\#2} + \alpha \end{array} \begin{array}{|c|c|c|c|c|c|c|} \hline k^2 r_5 - \frac{t_1}{2} & -\frac{t_1}{\sqrt{2}} & -\frac{i k t_1}{\sqrt{2}} & 0 & 0 & 0 & 0 \\ \hline -\frac{t_1}{\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 \\ \hline \frac{i k t_1}{\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & k^2 r_5 + \frac{t_1}{6} & \frac{t_1}{3\sqrt{2}} & 0 & \frac{i k t_1}{3} \\ \hline 0 & 0 & 0 & \frac{t_1}{3\sqrt{2}} & \frac{t_1}{3} & 0 & \frac{1}{3} i \sqrt{2} k t_1 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & -\frac{1}{3} i k t_1 & -\frac{1}{3} i \sqrt{2} k t_1 & 0 & \frac{2k^2 t_1}{3} \\ \hline \end{array}$$

Massive particle	
Pole residue:	$-\frac{1}{r_2} > 0$
Polarisations:	1
Square mass:	$\frac{t_1}{r_2} > 0$
Spin:	0
Parity:	Odd


$$r_2 < 0 \ \&\& \ r_5 < 0 \ \&\& \ t_1 < 0$$