

Wave operator and propagator

Quadratic (free) action

$$\begin{aligned}
 S = & \iiint \left(\frac{1}{6} (-4 t_3 \omega_{\alpha}^{\alpha} \omega_{\kappa}^{\kappa} + 6 f_{\alpha}^{\alpha \beta} \tau_{\alpha \beta} + 6 \omega^{\alpha \beta \chi} \sigma_{\alpha \beta \chi} + 8 t_3 \omega_{\alpha}^{\kappa} \partial_{\kappa} f^{\alpha \iota} - \right. \\
 & 8 t_3 \omega_{\kappa}^{\kappa} \partial_{\kappa} f_{\alpha}^{\alpha} + 4 t_3 \partial_{\kappa} f_{\alpha}^{\kappa} \partial^{\kappa} f_{\alpha}^{\alpha} - 6 r_3 \partial_{\beta} \omega_{\iota}^{\theta} \partial^{\iota} \omega^{\alpha \beta} - \\
 & 6 r_3 \partial_{\alpha} \omega^{\alpha \beta \iota} \partial_{\theta} \omega_{\iota}^{\theta} + 12 r_3 \partial^{\iota} \omega_{\alpha}^{\alpha \beta} \partial_{\theta} \omega_{\iota}^{\theta} + \\
 & 4 t_2 \omega_{\iota \theta \alpha} \partial^{\theta} f^{\alpha \iota} + 2 t_2 \partial_{\alpha} f_{\iota \theta} \partial^{\theta} f^{\alpha \iota} - t_2 \partial_{\alpha} f_{\theta \iota} \partial^{\theta} f^{\alpha \iota} - \\
 & t_2 \partial_{\iota} f_{\alpha \theta} \partial^{\theta} f^{\alpha \iota} + t_2 \partial_{\theta} f_{\alpha \iota} \partial^{\theta} f^{\alpha \iota} - t_2 \partial_{\theta} f_{\iota \alpha} \partial^{\theta} f^{\alpha \iota} - \\
 & 4 t_2 \omega_{\alpha \theta \iota} (\omega^{\alpha \iota \theta} + \partial^{\theta} f^{\alpha \iota}) + 2 t_2 \omega_{\alpha \theta} (\omega^{\alpha \iota \theta} + 2 \partial^{\theta} f^{\alpha \iota}) + \\
 & 8 r_2 \partial_{\beta} \omega_{\alpha \theta} \partial^{\theta} \omega^{\alpha \beta \iota} - 4 r_2 \partial_{\beta} \omega_{\alpha \theta \iota} \partial^{\theta} \omega^{\alpha \beta \iota} + \\
 & 4 r_2 \partial_{\beta} \omega_{\iota \theta \alpha} \partial^{\theta} \omega^{\alpha \beta \iota} - 2 4 r_3 \partial_{\beta} \omega_{\iota \theta \alpha} \partial^{\theta} \omega^{\alpha \beta \iota} - \\
 & 2 r_2 \partial_{\iota} \omega_{\alpha \beta \theta} \partial^{\theta} \omega^{\alpha \beta \iota} + 2 r_2 \partial_{\theta} \omega_{\alpha \beta \iota} \partial^{\theta} \omega^{\alpha \beta \iota} - \\
 & 4 r_2 \partial_{\theta} \omega_{\alpha \beta} \partial^{\theta} \omega^{\alpha \beta \iota} + 4 t_3 \partial_{\kappa} f_{\alpha}^{\alpha \iota} \partial_{\kappa} f^{\kappa} - \\
 & \left. 8 t_3 \partial_{\kappa} f_{\alpha}^{\alpha} \partial_{\kappa} f^{\kappa} \right) [t, x, y, z] dz dy dx dt
 \end{aligned}$$

The diagram shows two vertices connected by a horizontal dashed line representing a massive particle. The left vertex has two external lines (one solid, one dashed) and is labeled $J^P = 0^-$. The right vertex has two external lines (one solid, one dashed). A momentum vector k^μ is shown below the dashed line pointing from left to right. To the right of the diagram is a table with properties of the massive particle.

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

$$r_2 < 0 \ \&\& \ t_2 > 0$$
[illegible]