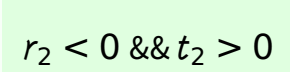


# Wave operator and propagator

$$\begin{aligned}
& \text{Quadratic (free) action} \\
& S = \iiint \left( \frac{1}{6} (-4t_3 \omega_{\alpha}^{\alpha\iota} \omega_{\iota\kappa}^{\kappa} + 6f_{\kappa}^{\alpha\beta} \tau_{\alpha\beta} + 6\omega^{\alpha\beta\chi} \sigma_{\alpha\beta\chi} + 8t_3 \omega_{\alpha\kappa}^{\kappa} \partial_{\iota} f^{\alpha\iota} - \right. \\
& \quad 8t_3 \omega_{\iota\kappa}^{\kappa} \partial_{\iota} f_{\kappa}^{\alpha} + 4t_3 \partial_{\iota} f_{\kappa}^{\kappa} \partial_{\iota} f_{\alpha}^{\alpha} + 4t_2 \omega_{\iota\theta\alpha} \partial^{\theta} f^{\alpha\iota} + \\
& \quad 2t_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} + \\
& \quad t_2 \partial_{\theta} f_{\alpha\iota} \partial^{\theta} f^{\alpha\iota} - t_2 \partial_{\theta} f_{\iota\alpha} \partial^{\theta} f^{\alpha\iota} - 4t_2 \omega_{\alpha\theta\iota} (\omega^{\alpha\iota\theta} + \partial^{\theta} f^{\alpha\iota}) + \\
& \quad 2t_2 \omega_{\alpha\iota\theta} (\omega^{\alpha\iota\theta} + 2\partial^{\theta} f^{\alpha\iota}) + 8r_2 \partial_{\beta} \omega_{\alpha\iota\theta} \partial^{\theta} \omega^{\alpha\beta\iota} - \\
& \quad 4r_2 \partial_{\beta} \omega_{\alpha\theta\iota} \partial^{\theta} \omega^{\alpha\beta\iota} + 4r_2 \partial_{\beta} \omega_{\iota\theta\alpha} \partial^{\theta} \omega^{\alpha\beta\iota} - \\
& \quad 2r_2 \partial_{\iota} \omega_{\alpha\theta\beta} \partial^{\theta} \omega^{\alpha\beta\iota} + 2r_2 \partial_{\theta} \omega_{\alpha\beta\iota} \partial^{\theta} \omega^{\alpha\beta\iota} - 4r_2 \partial_{\beta} \omega_{\alpha\iota\theta} \\
& \quad \partial^{\theta} \omega^{\alpha\beta\iota} + 6r_5 \partial_{\iota} \omega_{\kappa}^{\kappa} \partial^{\theta} \omega_{\kappa}^{\alpha\iota} - 6r_5 \partial_{\theta} \omega_{\iota\kappa}^{\kappa} \partial^{\theta} \omega_{\alpha}^{\alpha\iota} + \\
& \quad 4t_3 \partial_{\iota} f_{\kappa}^{\alpha\iota} \partial_{\kappa}^{\kappa} - 8t_3 \partial_{\iota} f_{\kappa}^{\alpha} \partial_{\kappa}^{\kappa} - 6r_5 \partial_{\alpha} \omega^{\alpha\iota\theta} \partial_{\kappa} \omega_{\iota\theta}^{\kappa} + \\
& \quad 12r_5 \partial^{\theta} \omega_{\alpha}^{\alpha\iota} \partial_{\kappa} \omega_{\iota\theta}^{\kappa} + 6r_5 \partial_{\alpha} \omega^{\alpha\iota\theta} \partial_{\kappa} \omega_{\theta\iota}^{\kappa} - \\
& \quad \left. 12r_5 \partial^{\theta} \omega_{\alpha}^{\alpha\iota} \partial_{\kappa} \omega_{\theta}^{\kappa} \right) [t, x, y, z] dz dy dx dt
\end{aligned}$$

## Unitarity conditions

[illegible]